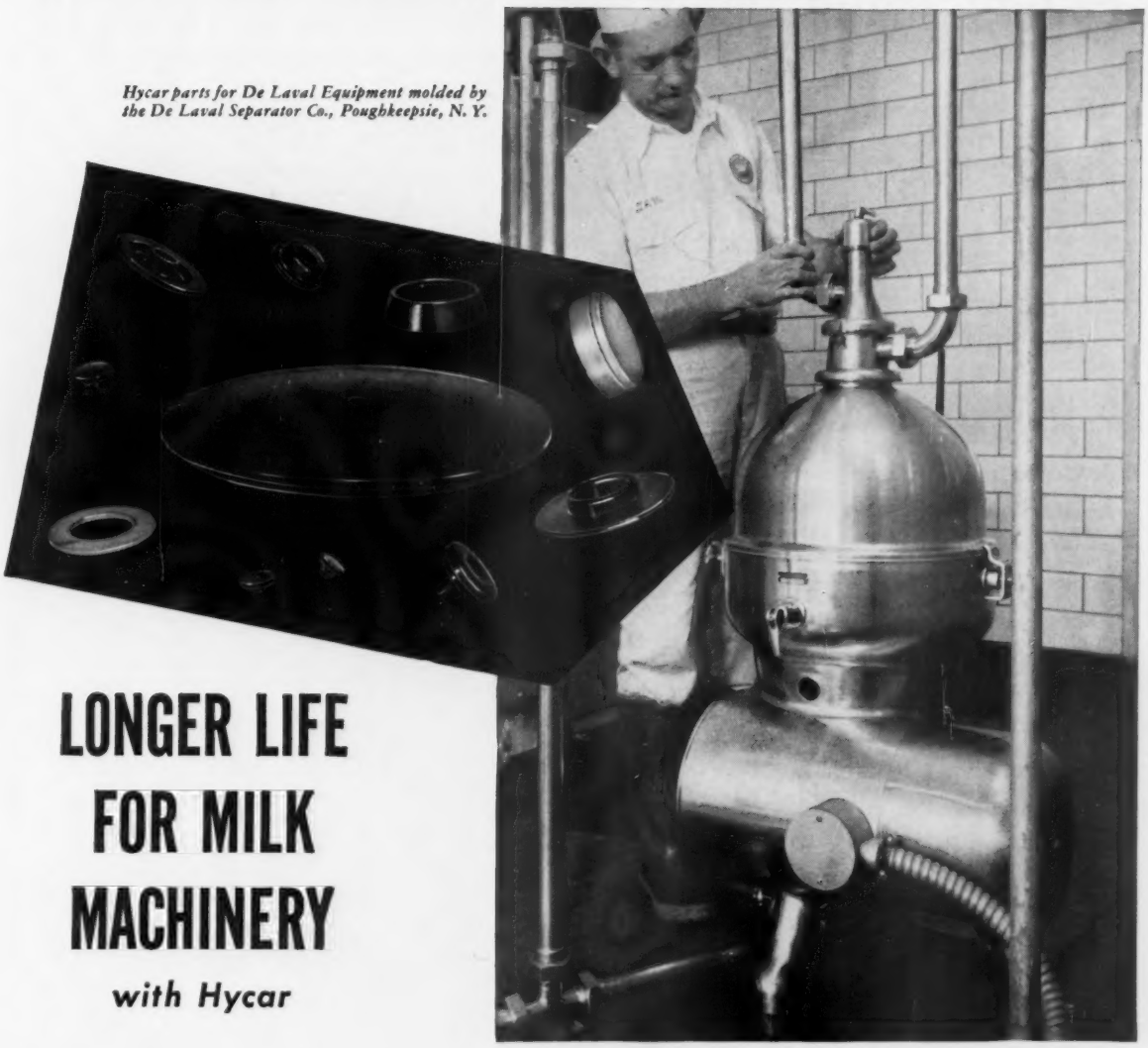
Another new development using

B. F. Goodrich Chemical *raw materials*

Hycar parts for De Laval Equipment molded by the De Laval Separator Co., Poughkeepsie, N. Y.



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CUTTING costs in milk production is good business for everybody. On dairy machines like milkers, separators, and coolers, the unique properties of Hycar American rubber help keep maintenance and replacement costs at a minimum.

Butterfat, for all its wholesome goodness, causes rapid deterioration of dairy equipment parts made from ordinary rubber. But a leading manufacturer who uses Hycar for check valves, cream seals, vacuum control caps, and many other parts gets up to three times the service life.

What's more, Hycar's exceptional resistance to chemicals, abrasion, and high temperatures makes it a natural for use on milk machinery—which has to be doused with strong detergents, scrubbed, and sterilized several times daily.

On farms, in oil-fields, and factories in almost every branch of industry, products and parts made from Hycar last longer, do many jobs better. Versatile Hycar can be molded, extruded, shaped to precise dimensions, and is readily blended with other materials to obtain special characteristics. For the complete Hycar story, please write Department CJ-11, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. Cable address: Goodchemco. In Canada: Kitchener, Ontario.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
American Rubber

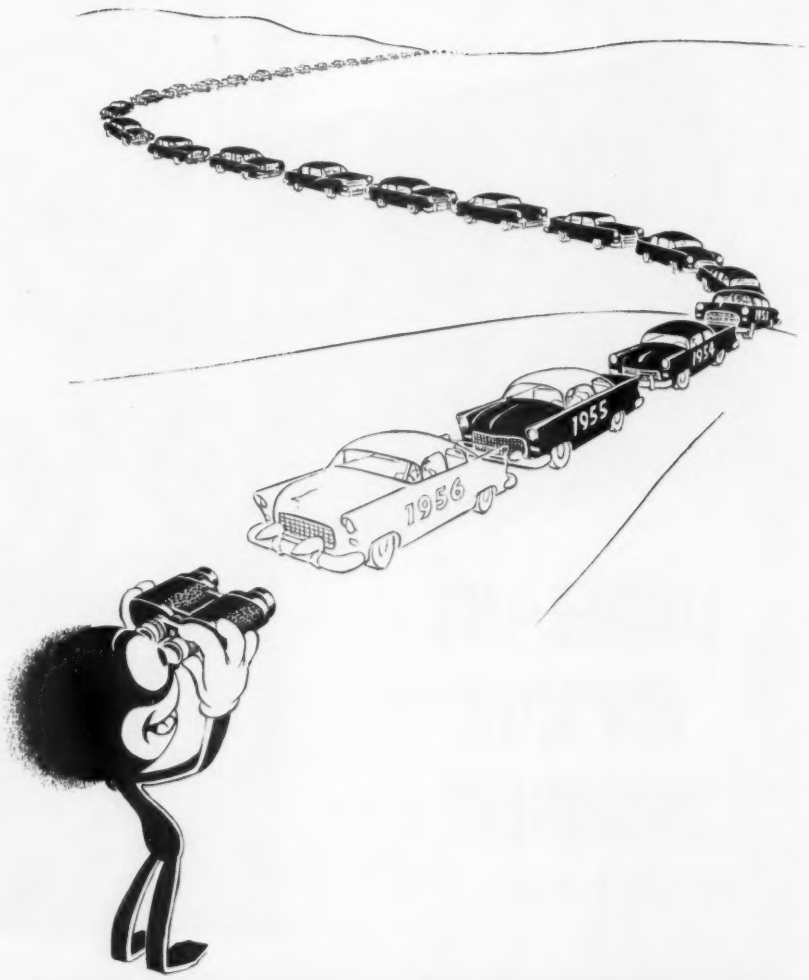
GEON polyvinyl materials • HYCAR American rubber and latex • GOOD-RITE chemicals and plasticizers • HARMON colors

PHILBLACK® EXPERIENCE with tires covers many years and millions of miles!

We've tested tires on the road and in the laboratory. We've timed the rate of growth of cuts and cracks. We've measured the treads to a thousandth of an inch to find the abrasion rate. And we've compiled important data on flex life, aging, and tensile strength.

From this information we've developed rubber recipes best suited for particular needs . . . for low-cost tire carcasses, for longer-wearing treads and for other applications.

The valuable knowledge we've gained from years of experience in this field is available to rubber manufacturers. If you have a particular problem our Phil black research department may have the answer. If not, we'll try to get it for you, without obligation. For more information consult your Philblack technical representative.



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A **Philblack A FEF Fast Extrusion Furnace Black**
Ideal for smooth tubing, accurate molding, satiny finish. Mixes easily. High, hot tensile. Disperses heat. Non-staining.

I **Philblack I ISAF Intermediate Super Abrasion Furnace Black**
Superior abrasion resistance at moderate cost. Very high resistance to cuts and cracks. More tread miles at high speeds.

O **Philblack O HAF High Abrasion Furnace Black**
For long, durable life. Good electrical conductivity. Excellent flex. Fine dispersion.

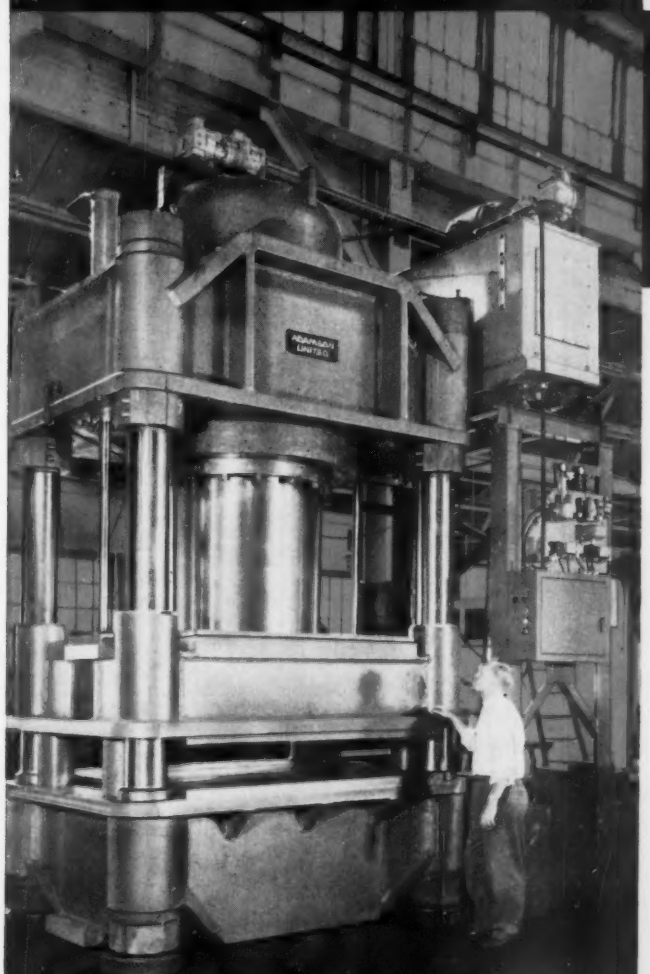
E **Philblack E SAF Super Abrasion Furnace Black**
Toughest black on the market. Extreme abrasion resistance. Withstands aging, cracking, cutting and chipping.

Phillips 66

PHILLIPS CHEMICAL COMPANY, Rubber Chemicals Division, 318 Water St., Akron 8, Ohio. Export Sales: 80 Broadway, New York 5, N. Y. West Coast: Harwick Standard Chemical Company, Los Angeles, California. Canada: H. L. Blachford, Ltd., Montreal and Toronto.

THIS

Adamson United HYDRAULIC PRESS



Engineered to customer's special requirements . . .

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DESIGNED . . . BUILT and TESTED

in less than 6 months

ANOTHER EXAMPLE OF THE ABILITY AND VERSATILITY OF ADAMSON ENGINEERING AND PRODUCTION

Our customer's requirements necessitated an entirely new design of hydraulic press. Starting from scratch, Adamson engineered, built and tested for service, this 1450 ton unit within a period of 6 months.

We have hundreds of standard press designs available, but when something *special* is required, we go "all out" to meet your needs. Every piece of new equipment is thoroughly tested on our erection floor in the customer's presence; and we supply competent technical assistance for first run operations if requested.

Why not talk over your press requirements with us . . . any time . . . without obligation?

Platen Size	76" x 76"
Total Hydraulic Pressure	1450 Tons
Stroke	40"
Daylight	50"
Ram Diameter	40"
Pull-Back Cylinders (2)	6"
Variable Volume Pump	
Compensator Control	

Adamson United Company

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A NEW TREND UNDERFOOT

—and the key is **CHEMIGUM**

Here's something new for shoe soles or any other rubber product where oil resistance may be needed. It's a series of stocks based on blends of CHEMIGUM and PLIOFLEX.

CHEMIGUM is the easy processing nitrile—first and finest of its type in the field. PLIOFLEX is a styrene rubber of the highest quality. Both have been used individually in high-grade shoe soles of various types.

Now, these outstanding rubbers have been blended to provide sole stocks which are better in combined oil-resistance and general performance properties than those provided by other types of rubber or blends (see photos and table). Other distinct advantages are a low specific gravity for a lighter weight sole at a very attractive pound-volume cost and excellent low temperature properties.

Moreover, you'll find these CHEMIGUM/PLIOFLEX blends are easy to process. They exhibit excellent bin aging properties, safe scorch values and can be mixed in the same manner as straight styrene rubber stocks. That's because CHEMIGUM, like PLIOFLEX, tends to soften under mastication.

Why not learn more about high-quality, low-cost CHEMIGUM/PLIOFLEX blends for shoe soles, hose, belting, molded goods or any rubber products exposed to oil? Samples and technical help are yours by writing to:

Goodyear, Chemical Division,
Rubber & Rubber Chemicals Dept.,
Akron 16, Ohio

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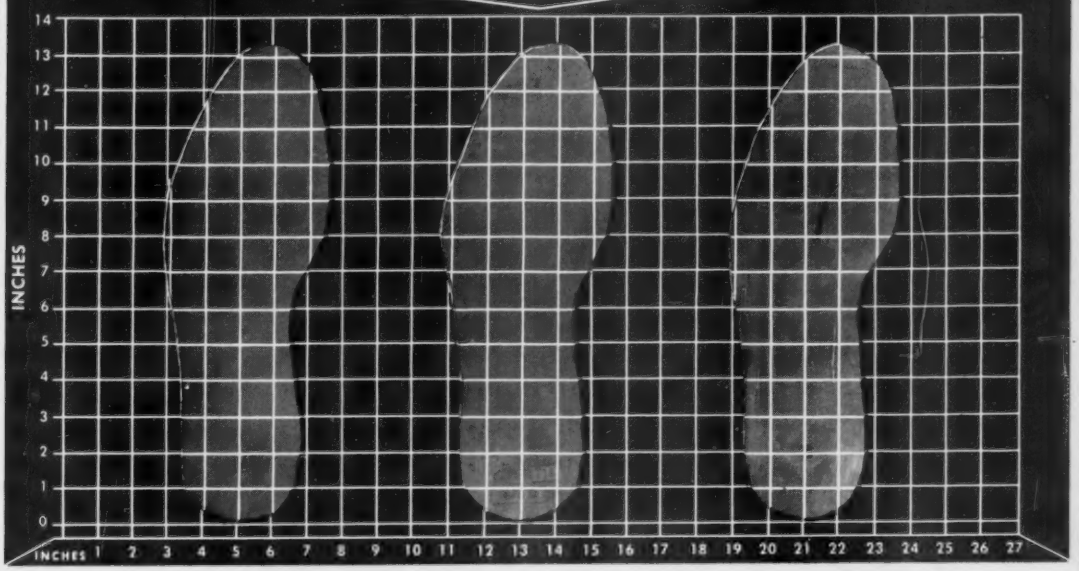
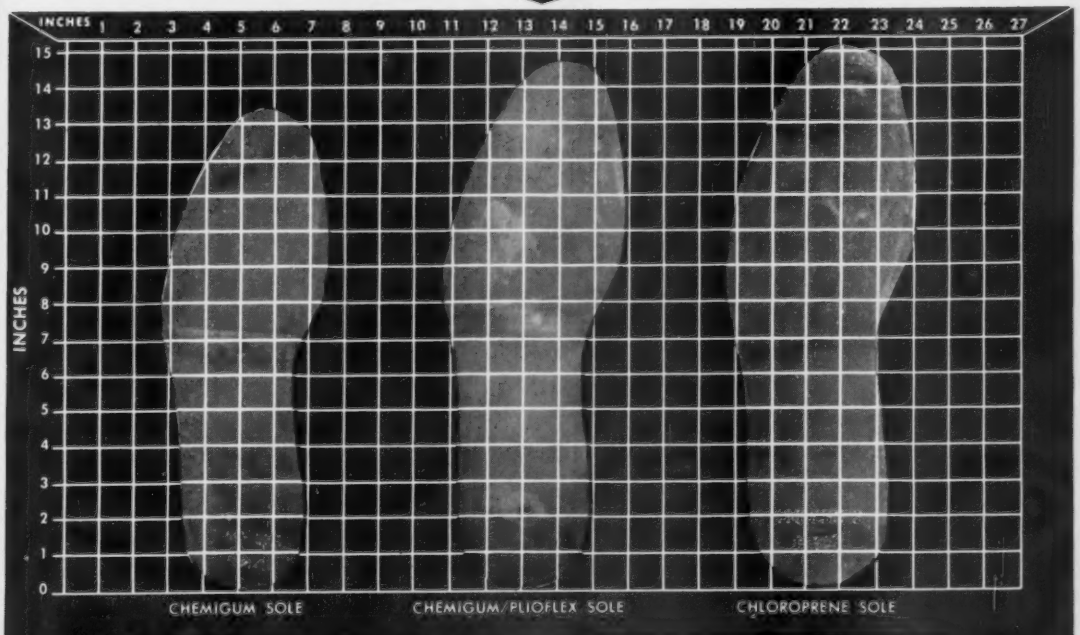
CHEMIGUM... another quality product of Goodyear Chemical Division

ORIGINAL SOLES



SOLES AFTER IMMERSION IN ASTM OIL #3 FOR 70 HOURS AT R. T.



PHYSICAL PROPERTIES OF CHEMIGUM and CHEMIGUM/PLIOFLEX SOLE vs. CHLOROPRENE SOLE

	HARDNESS (SHORE A)	CRESCENT TEAR, LBS./IN.	ROSS FLEX (12 IRON SOLE AGED 24 HRS. @ 212°F. — ASTM #1 OIL ADDED TO CUT)	ABRASION RESISTANCE (BUREAU OF STANDARDS)	VOLUME SWELL, % INCREASE (AGED 70 HRS. IN ASTM #3 OIL @ 158°F.)	SPECIFIC GRAVITY	COST/LB. VOL.
CHEMIGUM SOLE*	86	521	43,238	90.7	3.66	1.305	41.3¢
CHEMIGUM/PLIOFLEX SOLE*	83	288	87,285	53.8	44.4	1.208	36.3¢
CHLOROPRENE SOLE*	90	416	47,008	56.6	71.2	1.42	40.7¢

*Formulations available on request

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for tires,

tubes,

fine extruded mechanical goods

FEF

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AROVEL (FEF) AROMEX HAF

ESSEX SRF MODULEX HMF
AROMEX ISAF AROMEX CF

Rubber Age

COVERING THE MANUFACTURE OF RUBBER AND RUBBERLIKE PLASTICS PRODUCTS

Published Monthly by
PALMERTON PUBLISHING CO., INC.
Editorial and Advertising Offices
101 West 31st St.,
New York 1, N. Y.
PEnnsylvania 6-6872

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5107 Telegraph Road, Los Angeles 22, Calif. — Phone: ANgelus 1-8136.

PHIL GLANZER
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New England
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IT DISPERSES easily and uniformly—cuts mixing time!"

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DETERO WAX has been tried and tested in rubber formulations, and has definitely been established as a superior protection against weather and ozone.

Specific wax blends for unusual rubber formulations can be beaded according to your specifications.

Blended DETERO WAX BEADS speed processing and improve the product.

We have also developed special DETERO WAX BEADS for VINYL PLASTICS. LET US WORK WITH YOU—TO IMPROVE YOUR PRESENT PRODUCTS or to DEVELOP NEW PRODUCTS FOR SPECIAL REQUIREMENTS OR CONDITIONS.

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* Process patent applied for.

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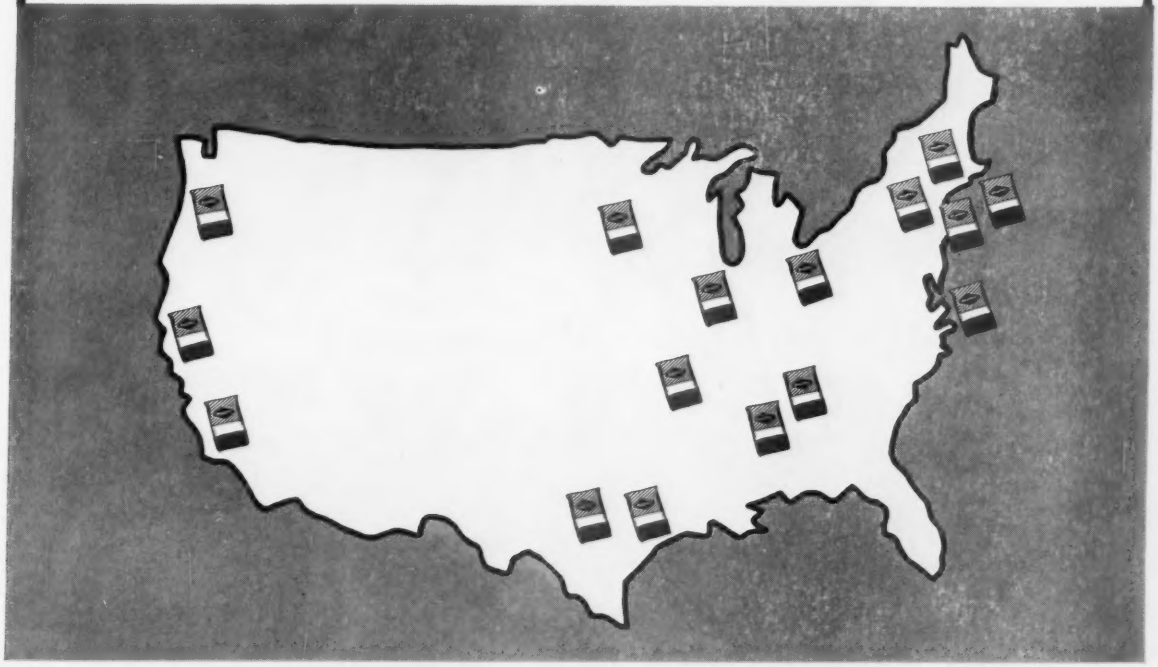
—hot, nonpigmented, staining type	—hot, nonpigmented, nonstaining type	—cold, nonpigmented, nonstaining type	—cold, oil masterbatch (25 parts oil), nonstaining type	—cold, oil masterbatch (37½ parts oil), staining type



NETWORK FOR NEWS

plus service and technical help on **Plioflex**

Stretched across the country is a network of sales offices, warehouses and plants which work in unison toward a single goal. That goal is to give you the ultimate in service and technical assistance on PLIOFLEX—Goodyear Synthetic Rubber.

In the sales offices you'll find technically trained representatives who are able and anxious to keep you fully posted on any new developments or established techniques on the use of PLIOFLEX. In the strategically located warehouses you'll find experienced staffs who know how to fill orders promptly and properly. And in the plants, production and laboratory personnel whose prime objective is to maintain the highest standards of product quality and uniformity.

PLIOFLEX is the family name for a series of styrene rubbers. They include "hot," "cold" and oil-extended types, with emphasis on the nonstaining polymers which are ideally suited for light-colored applications. Learn more about PLIOFLEX by writing, on company letterhead, for the free brochure, "PLIOFLEX" to:

Goodyear, Chemical Division, Akron 16, Ohio

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NEW

PLASTOLEIN® 9404 TGP

a superior
synthetic rubber plasticizer
at lower cost!

New Plastolein 9404 TGP (triethylene glycol dipelargonate) offers superior performance in synthetic rubbers. Yet it *costs less* than commonly used low-temperature plasticizers.

For example, as compared to other more expensive glycol-type esters and adipate plasticizers, 9404 gives lower heat loss, lower compression set, less water sensitivity and equivalent low-temperature flexibility.

In addition, since Plastolein 9404 is produced in accurately controlled equipment from easily obtainable domestic raw materials, high quality standards are maintained and continuing availability assured.

For detailed information on Plastolein 9404 TGP, mail coupon, or write for an evaluation sample.

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for vulcanized bonding of BUTYL rubbers to metals

TY-PLY UP — the universal Primer, and TY-PLY BC, the Butyl Cover Cement, give exceptional bonds of Butyl compounds to metals regardless of cure system or type and amount of filler.

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the two coat Adhesive System for bonding Natural Rubber and GR-S Compounds

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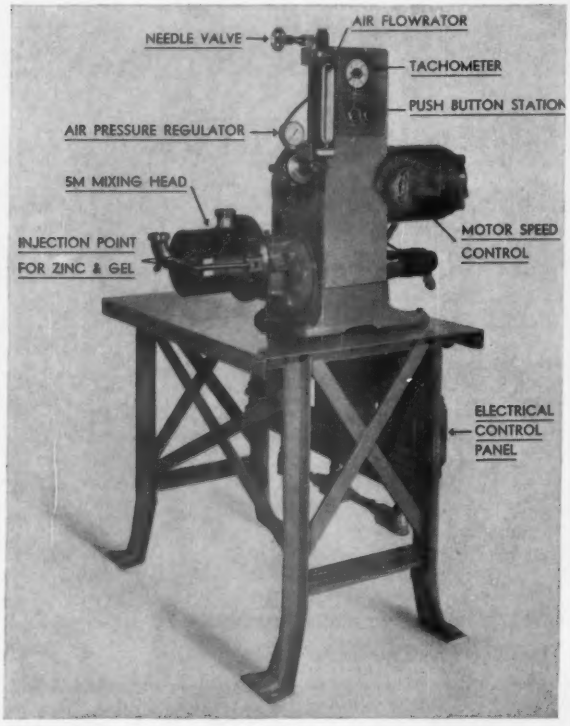
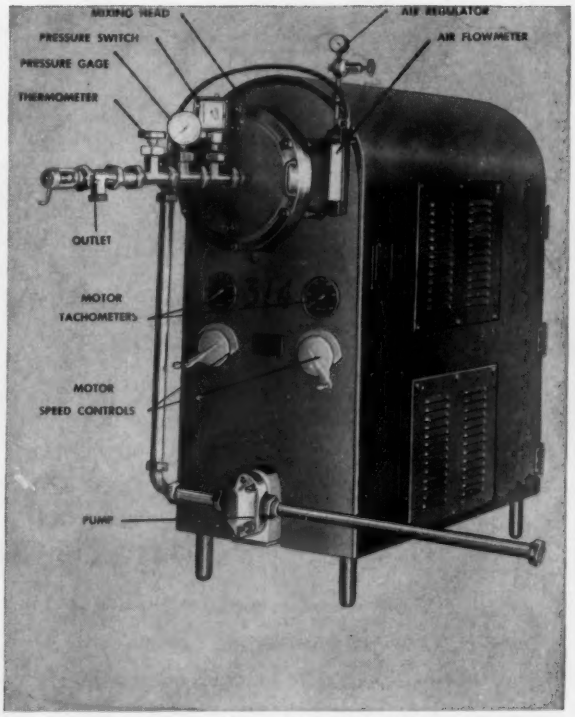
FOAM RUBBER, FASTER, FINER, WITH OAKES' MIXER-BLENDER TEAM!

Probably you have an Oakes Continuous Automatic Mixer for your foam rubber production. If you do you know all about the performance that has led to the installation of Oakes Mixers in leading plants throughout the world. This exceptional performance—up to 1800 pounds of wet latex per hour—has now been further stepped up by the Oakes Blender. With the blender added, practically no stoppage at all is required for cleaning; uninterrupted operation, hour after hour is made easy, with production of foam rubber of superlative quality.



Oakes Blender



Oakes Continuous Automatic Mixer

Zinc and gel, instead of being introduced in the foaming head of the mixer, are injected in the blender head; hence there is no chance of coagulation in the foaming head, and no need of stoppage for cleaning. The blender head can be opened in a matter of seconds simply by loosening two thumb screws; cleaning requires only the squirt of a hose.

The Oakes Mixer-Blender combination will give you fast, clean production of foam rubber of unmatched quality, uniform, and of satin smoothness, with savings in raw material and labor that are impressive.

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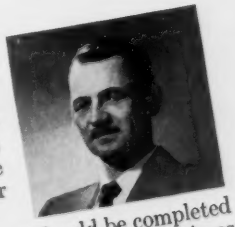

Mr. P. H. Delacour, Executive Vice President of Cabot Carbon of Canada, Ltd., Sarnia, Ontario, Canada, announces an important expansion of the Company's plant facilities to increase production of oil furnace blacks to 55 million pounds per year.

"Expansion", states Mr. Delacour, "should be completed during the next two months, permitting almost three times the original planned plant production of a variety of oil furnace blacks to meet Canada's increasing industrial requirements."

"This increase", Mr. Delacour goes on to say, "should be sufficient for the present and future anticipated oil furnace black requirements of the entire Canadian rubber manufacturing industry. Cabot Carbon of Canada, Ltd. has been producing primarily HAF, high abrasion furnace blacks, including the ISAF, intermediate super abrasion furnace type, and FEF, fast extruding furnace blacks. We shall continue to make increasing quantities of all of these types available, and will also manufacture other oil furnace blacks as needed by the Canadian rubber industry."

Godfrey L. Cabot, Inc., U.S.A., is the world's only manufacturer of a complete range of channel, furnace and thermal carbon blacks. Cabot has been manufacturing chemicals for industry since 1882.

GODFREY L. CABOT, INC.

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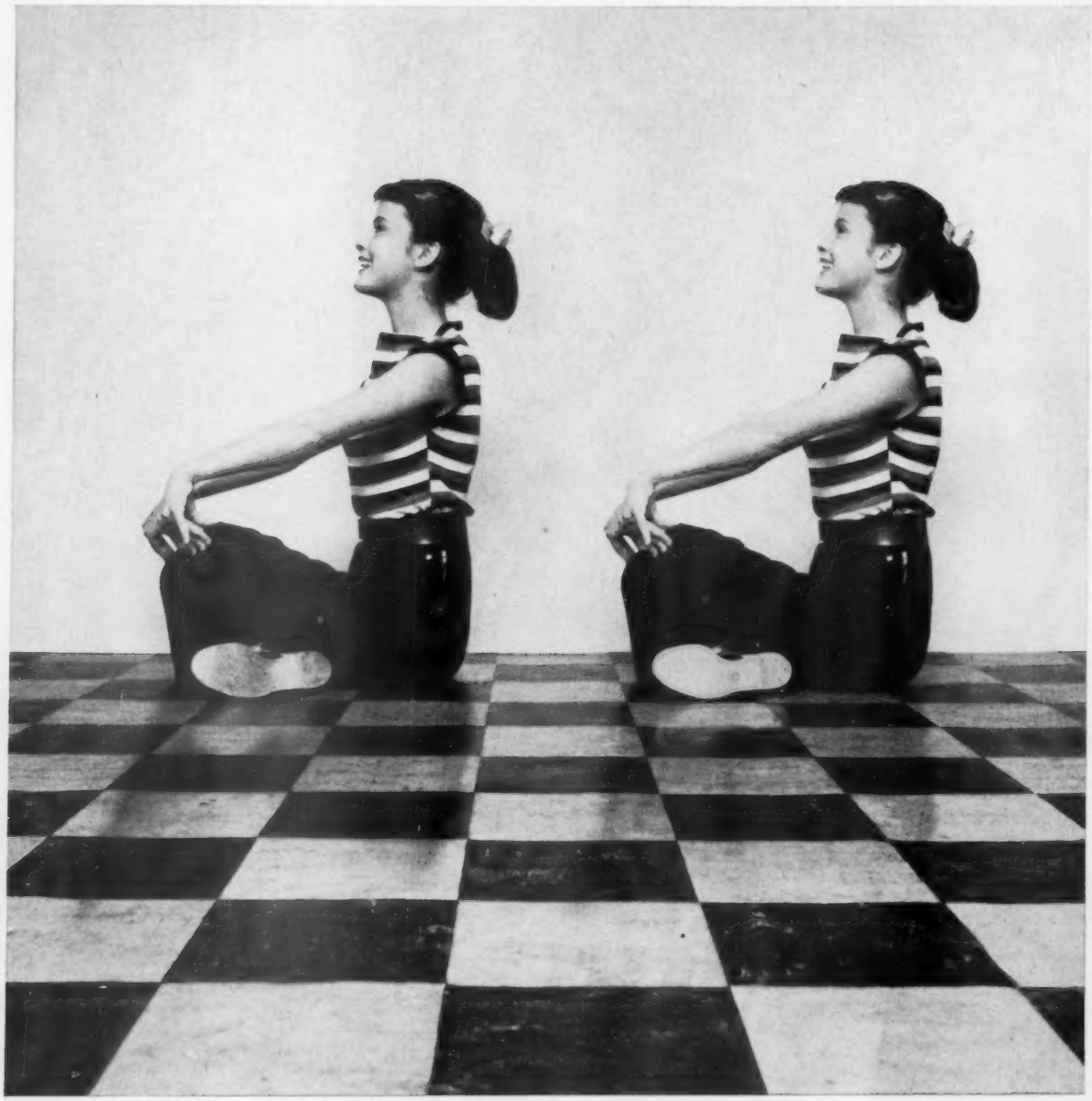

Which sole has the SOLKA-FLOC®?

It's the sole that stays flat—holds its shape. And it makes a direct appeal to mothers who are constantly faced with the problem of teen-age wear.

Solka-Floc is the reason. It gives the necessary dimensional stability to flexible rubber soles, floor tile, and like products. Besides . . .

It reduces blistering and nerve, improves dispersion, controls shrinkage, permits sharper designs and harder, smoother surfaces.

A finely divided, highly purified wood cellulose, Solka-Floc speeds production, gives your product zip and appeal and is economical to use.

Let us show you how it can solve your specific process problems. Outline them in a letter to Technical Service, Dept. FG-11, Boston office.

BROWN COMPANY, Berlin, New Hampshire

General Sales Office:
150 Causeway Street, Boston 14, Mass.

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NIBROC TOWELS • NIBROC KOWTOWLS • NIBROC
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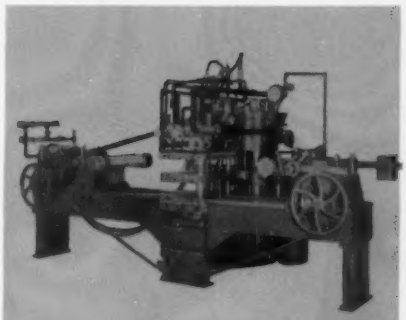

Open Gap 47-Ton Belt Press for curing flat and V-type transmission belts. The moving platen is accurately machined from a rolled steel slab and is guided by long, full-round babbitted guides on the strain rods. Intermediate platen has drilled channels to provide two heating circuits, one for each surface. For information on this or other presses for the rubber, plastics, woodworking or metalworking industries, write us today.

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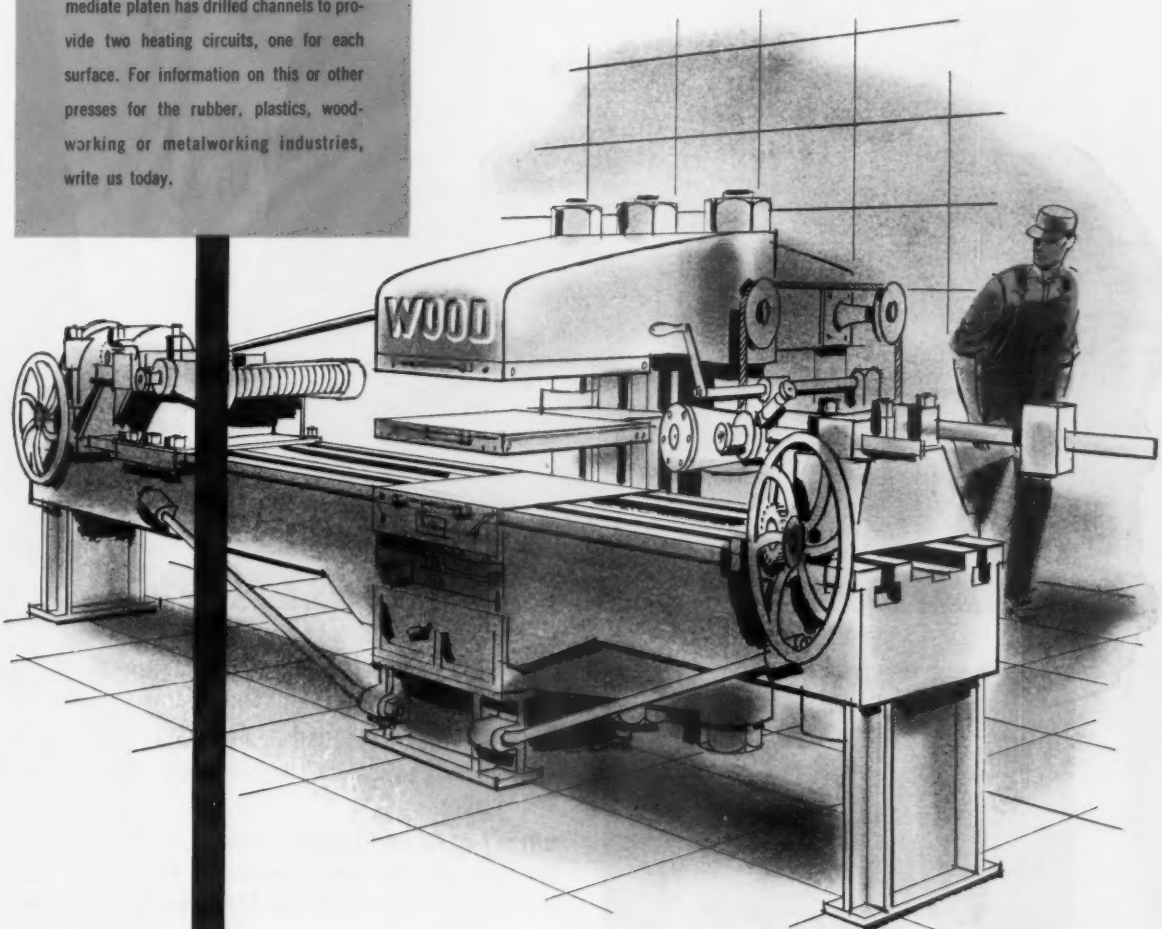
When an R. D. Wood press swings into action, gratifying things happen to production costs. For, in most cases, production climbs to a new high and down-time for repairs approaches zero. The reason is the smooth, dependable performance of R. D. Wood presses—even under difficult conditions. And the reasons for this superior performance are the exacting standards set by R. D. Wood—in design, selection of materials, and craftsmanship. If your company's theme is low-cost production, here is your prelude—ready made.



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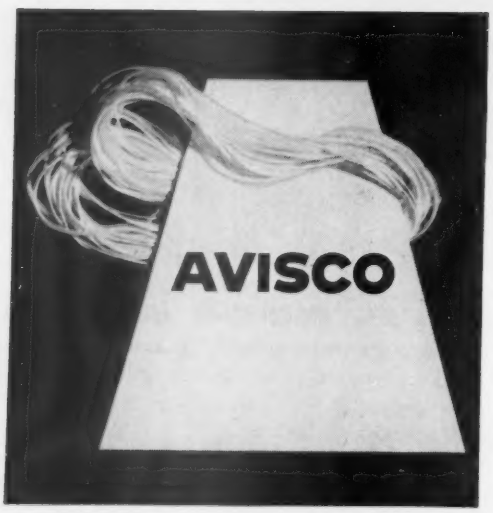

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ONLY AMERICAN VISCOSE offers co-ordinated service, with our Chemical, Textile and Fabric Research working closely with Market Development and Sales.

. . . and American Viscose Corporation, the oldest and largest producer of rayon, has the experience and the facilities to best serve your needs. We think AVISCO products and services can benefit you as a manufacturer of mechanical goods. Why not talk it over with us?

America's greatest industries grow with **AVISCO**®

American Viscose Corporation, 350 Fifth Avenue, New York 1, New York

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United Carbon Company, Inc.

of Charleston, W. Va., manufactures

dependable carbon blacks for

rubber and other uses.

Call today!

DIXIE 20

Dixie 20, Semi-Reinforcing (SRF) furnace black, boasts by far the widest applications in various types of rubbers, and is indispensable to ever so many compounders.

Dixie 20 is non-staining and is most uniform. It is characterized by high loading capacity; easy and smooth processing; softness; a good balance of tensile, modulus, and high resilience; low heat build-up; high resistance to flexing; and improved aging – all this plus low volume cost.

Dixie blacks are in the front for unsurpassed performance. It is wise to standardize on United blacks and stay in the lead.

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NEW YORK AKRON CHICAGO BOSTON MEMPHIS

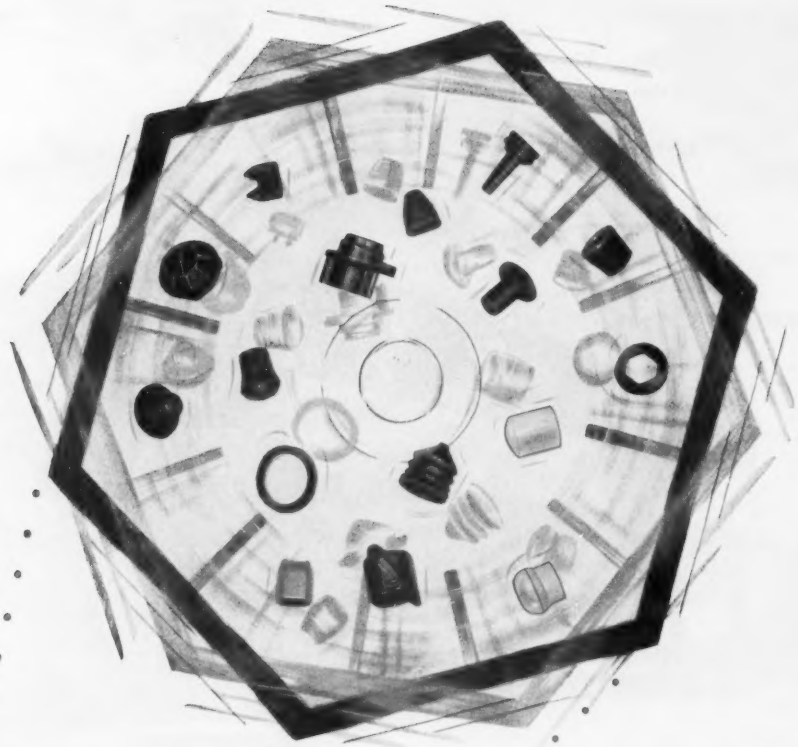
Firmly established

The considerable demand for Shaw machinery from across the Atlantic and the expansion of Canadian industry, led to the building, in 1953, of the first Shaw overseas factory. This factory, at Burlington, Ontario, is now firmly established to offer completely modern processing equipment for the Canadian and American rubber and plastic industry. Shaw prices are competitive, with good delivery backed by first-class after sales service.

SHAW

FRANCIS SHAW & COMPANY LIMITED
MANCHESTER II, ENGLAND Telex: 66-357
LONDON OFFICE: Terminal House, Grosvenor Gardens, LONDON, S.W.1.
Telephone No. SLOane 0675/6.
Telex 2-2250 Telegrams: "Vibrate London Telex"

FRANCIS SHAW (CANADA) LIMITED, GRAHAM'S LANE, BURLINGTON, ONTARIO, CANADA
TELEPHONE: NELSON 4-2250 TELEGRAMS: CALENDER BURLINGTON ONTARIO



"CO_2 TUMBLING CUTS OUR DEFLASHING COSTS 1/3 AND GIVES US TOP QUALITY,"

Harris Products Company's CO_2 rubber tumbling installation. 3-barrel set-up has a capacity in excess of 18,000 lbs. per day. CO_2 is supplied from the Liquiflow CO_2 receiver immediately behind barrels. This unit stores CO_2 at a low temperature and pressure—makes CO_2 instantly available at the turn of a valve.

reports the Management of Harris Products Company, a Division of Clevite Corporation, **Milan, Ohio.**

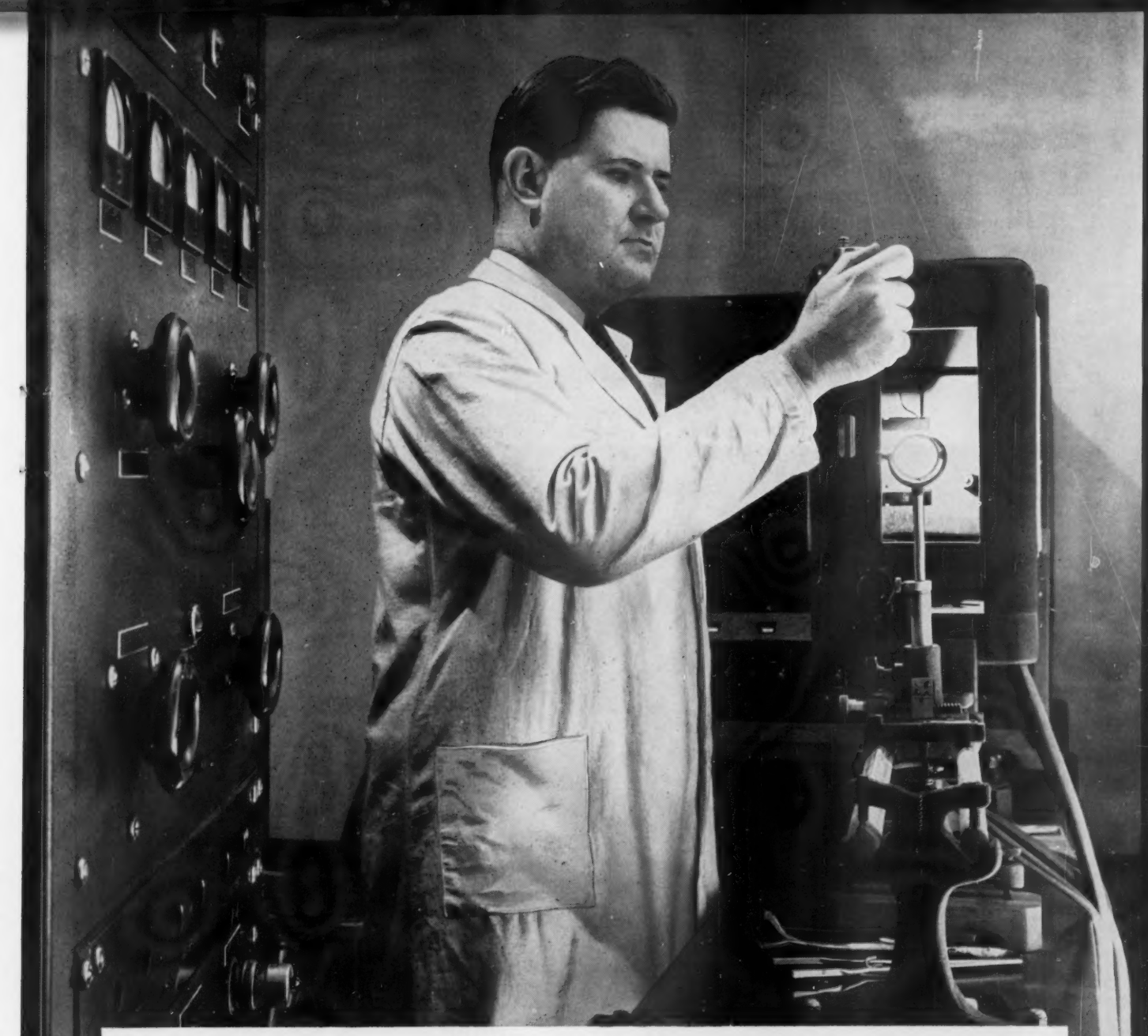
Flash-free in far less time – at far less cost. CO_2 tumbling is the *modern, automatic* way to remove flashing and rind from rubber products and components.

Ends expensive hand trimming. CO_2 tumbling makes costly, time-taking manual methods obsolete—frees valuable labor for more important work.

Complete information on CO_2 rubber tumbling, or on any CO_2 application, is promptly available from Liquid Carbonic upon request.

LIQUID CARBONIC, as the world's largest producer, is a major supplier of CO_2 in all its forms, gas, liquid and solid (dry ice) to the foam rubber and plastics industries.

THE LIQUID CARBONIC CORPORATION
3102 South Kedzie Avenue • Chicago 23, Illinois



Portraits of impurities-taken 32 times faster!

Impurities in pigments are now measured in the Glidden laboratories in one hour on the emission spectrograph, as compared with the three or four days it required through chemical analysis. Here is another example of how Glidden uses every modern means to insure uniformity and outstanding quality in its pigments. The time saved permits research technicians to devote more hours to other important quality control projects which insure you of the finest in ZOPAQUE Titanium Dioxides; CADMOLITH Reds and Yellows; or SUNOLITH Lithopones.

THE GLIDDEN COMPANY

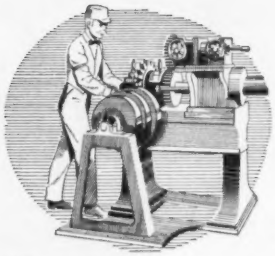
Chemicals • Pigments • Metals Division

Baltimore, Maryland • Collinsville, Illinois • Hammond, Indiana • Scranton, Pa.

CHEMICALS
PIGMENTS
METALS

QUALITY
Glidden
PRODUCTS

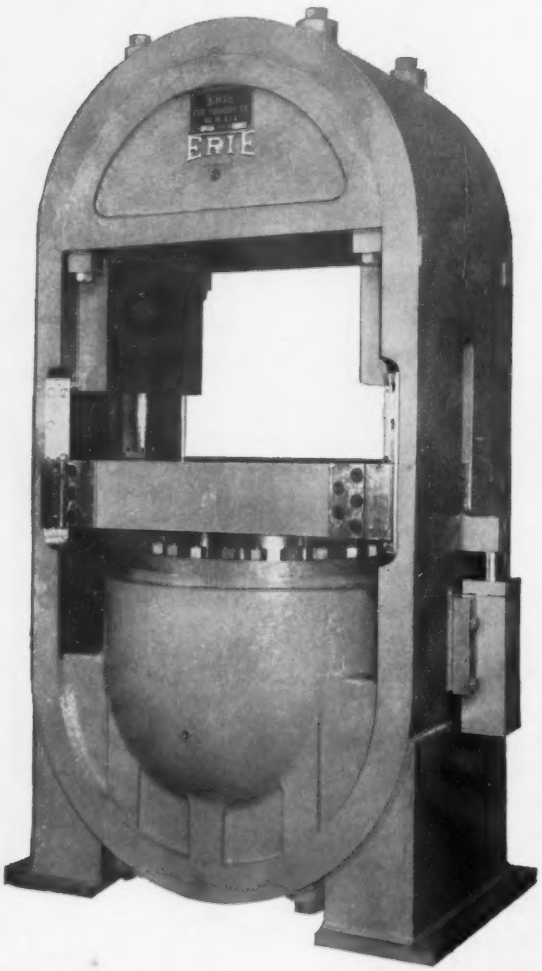
In the good old days



WHEN GRANDPA RAN THIS EXTRUDER

WHEN Germany was the world's largest exporter of rubber goods . . . when South America was the largest exporter of crude rubber which was then called Para . . . . . when the first Malaya plantation yielded crude rubber

ERIE FOUNDRY WAS A GREAT NAME IN HYDRAULIC PRESSES



in today's rubber shop

...when low stress insures minimum deflection

...when high pressures evenly applied to practically deflection-free (within .002 inches) platens guarantee thin flash lines

...when competitive bidding demands maximum service for minimum cost

ERIE

is by far the greatest name in special precision hydraulic presses

IN OUR 60TH YEAR

ERIE FOUNDRY CO. ERIE, PA.

Cabflex® DDA

CABOT'S *di-decyl adipate*

for best all-around low temperature properties at lowest cost

RECIPE	PARTS
PVC Resin	100
Cabflex® DOP	25
Low Temperature Plasticizer	As Shown
Basic Lead Carbonate	1.6
Lead Stearate	0.5

Compare....

	Cabflex® DDA	DOS *di-octyl sebacate*	Di-OZ *di-iso-octyl azelate*	DOA *di-2-ethylhexyl adipate*	TOF *tri-octyl phosphate*
Parts Low Temperature Plasticizer[1]	22.7	21.0	21.5	20.0	22.0
COST					
Pound Volume Cost of Compound	45.5¢	48.8¢	46.6¢	45.8¢	45.9¢
VOLATILITY[2]					
@ 70° C.—Weight Loss %	0.75	0.75	0.92	1.6	1.2
@ 90° C.—Weight Loss %	3.6	3.6	3.3	6.0	5.5
LOW TEMPERATURE PROPERTIES					
Clash and Berg—Tf[3]	−29.4°C.	−30.5°C.	−29.3°C.	−28.4°C.	−30.3°C.
Brittleness—SPI Impact[4]					
Passed	−35.0°C.	−35.0°C.	−30.0°C.	−30.0°C.	−30.0°C.
Failed	−40.0°C.	−40.0°C.	−35.0°C.	−35.0°C.	−35.0°C.

Cabot makes the Cabflex® DDA, but not the finished product

1 *Plasticizer system gives 100% modulus equal to 50PHR DOP*
2 *ASTM D1203—52T*
3 *Torsional stiffness—135,000 psi*
4 *Run on 10 mil. calendered film*

For technical bulletins and free samples, address

CABOT PLASTICS CHEMICALS DIVISION

GODFREY L. CABOT, INC.
77 Franklin St., Boston 10, Mass.

CABFLEX® Di-OP (di-iso-octyl phthalate)
CABFLEX® DOP (di-2-ethylhexyl phthalate)
CABFLEX® ODP (iso-octyl decyl phthalate)
CABFLEX® DDP (di-decyl phthalate)
CABFLEX Di-OA® (di-iso-octyl adipate)
CABFLEX® DOA (di-2-ethylhexyl adipate)
CABFLEX® ODA (iso-octyl decyl adipate)
CABFLEX® DDA (di-decyl adipate)
CABFLEX® Di-OZ (di-iso-octyl azelate)
CABFLEX Di-BA® (di-iso-butyl adipate)
CABFLEX® TCP (tricresyl phosphate)
CABOL® 100 (hydrocarbon oil plasticizer)

The THROPP 60" MILL

designed and built for

MAXIMUM EFFICIENCY–SUPERIOR PERFORMANCE –MINIMUM MAINTENANCE

This extra heavy duty 60" streamlined mill is designed and built in every detail to provide dependable uninterrupted production under the rigorous service conditions encountered in the Rubber and Plastics Industries.

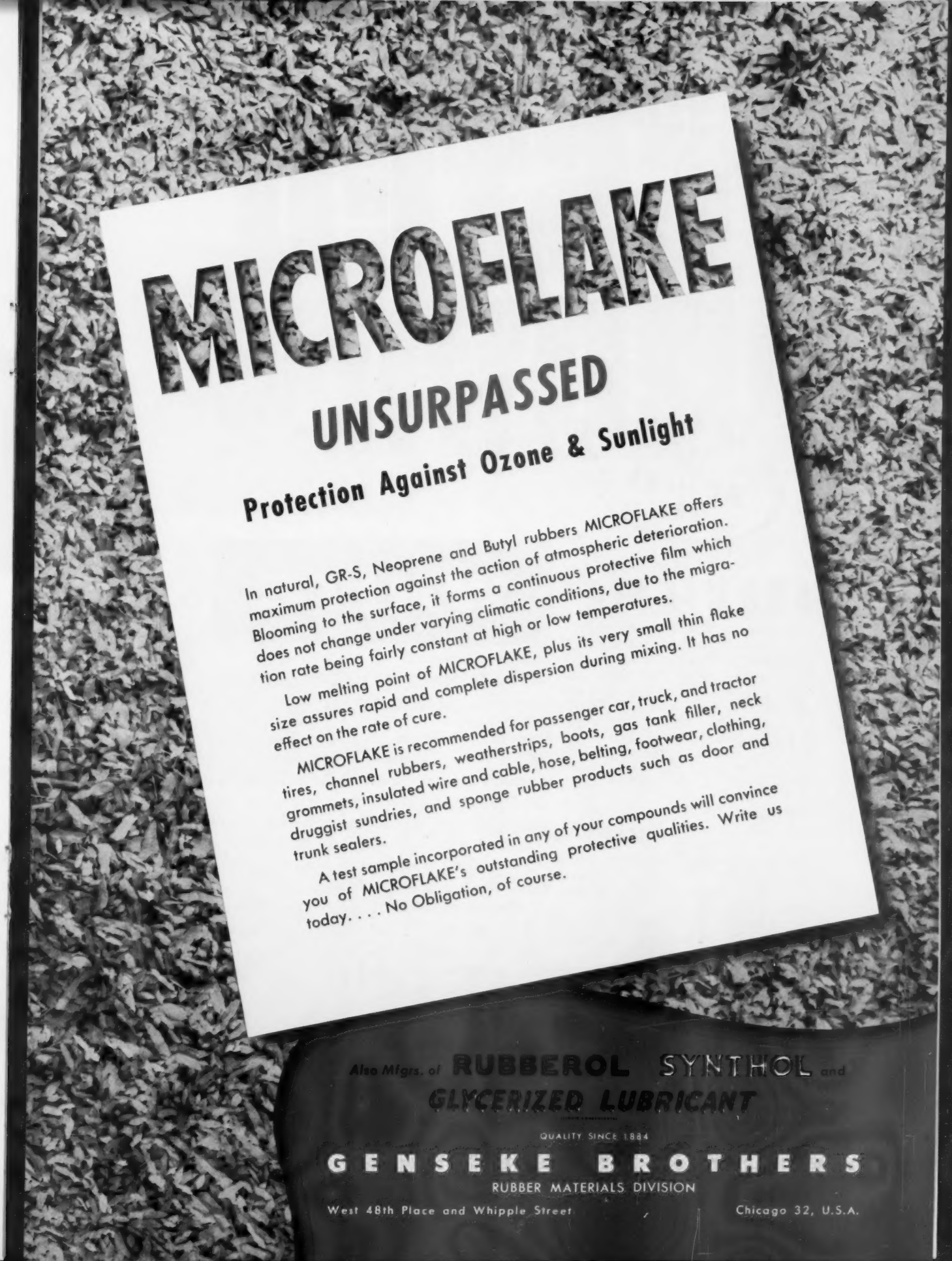
Built-in herringbone gear speed reducers, with anti-friction roller bearings, insure proper alignment with master gear and pinion at all times. Fully enclosed frames and guards keep cleaning and maintenance costs down.

Thropp 42", 50", 72" and 84" mills for the Rubber and Plastics Industries are also available.

SEND FOR FURTHER INFORMATION

Wm. R. THROPP & Sons

Division of J. M. LEHMANN COMPANY, Inc., 555 NEW YORK AVE., LYNDHURST, N. J.


MICROFLAKE
UNSURPASSED
Protection Against Ozone & Sunlight
In natural, GR-S, Neoprene and Butyl rubbers MICROFLAKE offers maximum protection against the action of atmospheric deterioration. Blooming to the surface, it forms a continuous protective film which does not change under varying climatic conditions, due to the migration rate being fairly constant at high or low temperatures.
Low melting point of MICROFLAKE, plus its very small thin flake size assures rapid and complete dispersion during mixing. It has no effect on the rate of cure.
MICROFLAKE is recommended for passenger car, truck, and tractor tires, channel rubbers, weatherstrips, boots, gas tank filler, neck grommets, insulated wire and cable, hose, belting, footwear, clothing, druggist sundries, and sponge rubber products such as door and trunk sealers.
A test sample incorporated in any of your compounds will convince you of MICROFLAKE's outstanding protective qualities. Write us today. . . . No Obligation, of course.
Also Mfgrs. of RUBBEROL SYNTHOL and
GLYCERIZED LUBRICANT
QUALITY SINCE 1884
GENSEKE BROTHERS
RUBBER MATERIALS DIVISION
West 48th Place and Whipple Street
Chicago 32, U.S.A.

TESTED PROVEN

IN ACTUAL USE

STABILITE WHITE

NON-STAINING NON-DISCOLORING ANTIOXIDANT

Since its introduction to rubber compounders, Stabilite White has proven itself again and again in actual use. Users report that this mobile liquid* Non-Staining, Non-Discoloring Antioxidant possesses maximum age-resisting properties, is easy to handle, has sun-light and flex-cracking resistance, and the ultimate in non-staining characteristics. Our customers also report that these properties are obtained at NO INCREASE in compounding costs. YOUR recipes — whether for crude rubber, natural or synthetic — can profitably be converted to include STABILITE WHITE . . . the PROVEN non-staining antioxidant.

*ALSO AVAILABLE IN POWDER FORM

MANUFACTURED BY CHEMICO, INC.
THE C. P. HALL CO. *Manufacturing Agents*

AKRON, OHIO ★ LOS ANGELES, CALIFORNIA ★ CHICAGO, ILLINOIS ★ NEWARK, N. J.

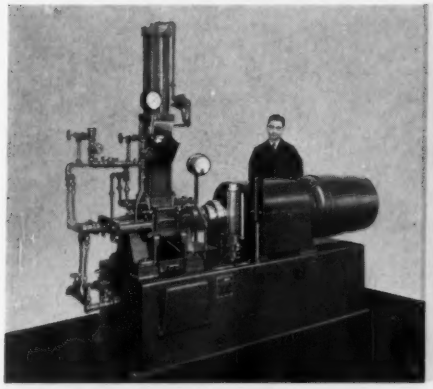
F-B LABORATORY EQUIPMENT

PERMITS WIDE SCOPE OF EXPERIMENTAL WORK... ACCURATE EVALUATION

6″ x 13″ TWO ROLL LABORATORY MILL

Four drive arrangements give wide choice of roll speeds and friction ratios: 1. Single AC motor to give constant roll speeds and 1.4:1 friction. 2. Single AC motor driving rolls through vari-speed sheaves to give variable roll speed and 1.4:1 friction ratio. 3. Two AC motors with vari-speed drives for friction ratios from even speed up to 2.1:1. 4. Two DC motors with variable voltage control for ratios from even speed up to 10:1 friction.

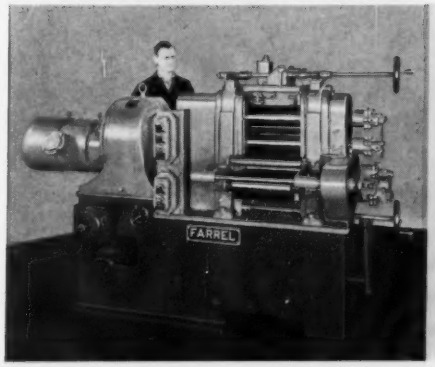
Standard mills have rolls bored for temperature control, self-contained automatic cascade lubrication for operation up to 350°F, swinging scraper and tilting guides. Optional features include chrome-plated rolls, extra hand scraper, air-operated scraper, ratchet roll adjustment, and batch-off roll.



SIZE B BANBURY MIXER

When this laboratory Banbury is equipped with a four-speed motor, as shown in the photograph, the effects of various speeds on different stocks can be readily determined. It has a capacity of 4 pounds of 1.50 specific gravity stock and will produce mixes comparable with those obtained in production size machines. Hence it is easy and economical to translate work done in the size B to a production Banbury, going, for example, from a 4-pound batch in the size B to a 450-pound batch in the size 11, or even a 1,000-pound batch in the size 27.

Entire unit is mounted on a high base of welded steel construction for convenient working height.



6″ x 13″ FOUR-ROLL CALENDER

This four-roll inverted L-type calender is designed to operate with roll temperatures up to 350°F. A 7½ HP, DC, adjustable-speed motor provides a wide range of roll speeds.

Adjustment of the top and bottom stack rolls is by hand-wheels. The side-roll adjusting screws are hand-operated by wrench. Adjustable guides are provided for the top and side roll pair.

All motors and controls, including the safety throwout, are explosion-proof. Brackets are mounted on the delivery side of calender frames to support a cooling drum, idler roll and windup.

Send for further information about this versatile laboratory equipment.

FARREL-BIRMINGHAM COMPANY, INC.

ANSONIA, CONNECTICUT

Plants, Ansonia and Derby, Conn., Buffalo and Rochester, N. Y.

Sales Offices: Ansonia, Buffalo, New York, Akron, Pittsburgh, Chicago, Fayetteville (N. C.), Los Angeles, Houston

Farrel-Birmingham ®

FB-1841

12 BENEFITS *from* DUREZ

PHENOLIC RESINS

for producers of hard and semi-hard **NITRILE RUBBER** *stocks*

1. *Improve* **MIXING** – the resin plasticizes and reduces nerve.
2. *Carry more* **LOADING** – due to its fluidity when hot.
3. *Improve* **MOLDING** – it becomes plastic and then hardens.
4. *Speed up* **VULCANIZING** – by its fast cure and vulcanizing effect.
5. *Increase* **HARDNESS** – it sets hard of itself.
6. *Increase* **STIFFNESS** – through its natural cured rigidity.
7. **REINFORCE** – with increased tensile strength.
8. *Step up* **WEAR** – it improves abrasive resistance.
9. *Withstand higher* **HEAT** – by its inherent heat resistance.
10. *Add* **CHEMICAL** *resistance* – by its natural resistance to solvents and chemicals.
11. *Produce* **GLOSSY** *finish* – another inherent resin property.
12. *Add* **WATER** *resistance* – by its resistance to water and oxidation.

If you have never used Durez resins in formulas for hard and semi-hard stocks made with nitrile-bearing rubber, you may think this list of benefits is "a little too long." All we can say is, they've all been reported to us by rubber manufacturers on the basis of experience. But there's no evidence so believable as your own. Why not test our special Durez resins for rubber compounding in your own laboratory? We'll gladly cooperate with samples and technical information.

A sampling of the wide variety of molded parts made of nitrile rubber compounded with Durez phenolic resin.

YOURS FOR THE ASKING — Our revised bulletin on resins in the rubber industry contains technical information that will help you assess these new procedures. Also free samples. Write today.

DUREZ PLASTICS DIVISION

HOOKER ELECTROCHEMICAL COMPANY

111 Walck Road, North Tonawanda, N. Y.

Phenolic Resins for
rubber molding stocks,
solvent-type adhesives,
synthetic rubber latices

DUREZ®

PHENOLIC RESINS

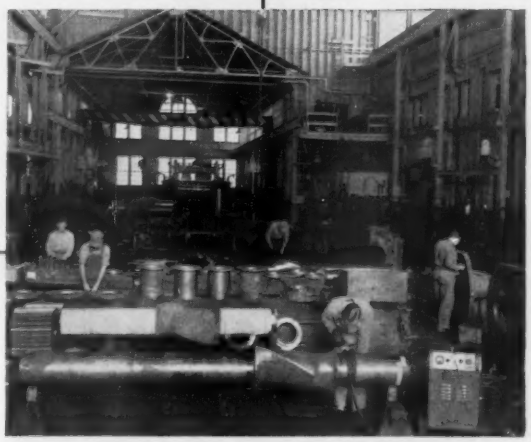
- MOLDING COMPOUNDS
- INDUSTRIAL RESINS
- PROTECTIVE COATING RESINS

KNOW-HOW

. . . plays a big part in the S.C.S.*
Method of Rebuilding BANBURY MIXERS

* S.C.S. means Skinner Certified Service. A tool is no better than the man who operates it. Skinner has the most improved machine tools for every required operation . . . and the men who run them have had long experience in precision operations. The same close tolerance work as required in the building of SKINNER high-precision steam engines is employed in the rebuilding of Banbury Mixers. It's the same type of work they grew up on. Searching inspection and rigid testing, too, are routine procedures . . . on SKINNER Engines or Banbury Mixers.

SECO
ESTABLISHED 1868



Inspection of Banbury parts prior to assembly in the Skinner plant.

A few POINTERS ON S. C. S.

- All rebuildable parts of dismantled body are checked for hidden imperfections, for standard dimensions and distortion.
- Sides are bored out, and 2-in. liners of customer's choice installed.
- Rotors are completely stripped of hard-surfacing materials, and bodies rebuilt to proper contour. Entire rotor, inclusive of threads, is rebuilt, body hard surfaced, stress relieved, and restored to standard dimensions.
- Sliding door, dust seal rings, and body fit bolts are always provided new.
- All parts are carefully examined by skilled technicians and magnafluxed.

SKINNER · ENGINE · COMPANY

SECO ESTABLISHED 1868

RUBBER MACHINERY DIVISION
TELEPHONE ERIE 2-3661

ERIE 6 · PENNSYLVANIA

Our Buffalo plant is ideal for quick service to western points, because it is within 200 miles of Akron, and is large and fully equipped. It is a good central point for shipment by rail, truck, or water. Our Derby plant is heavily stocked for quick service to eastern points.

FASTER SERVICE WITH

Two plans for Banbury® body exchange
Two locations to ship from

1. You get fastest service by exchanging your worn Banbury for a new one. We carry stocks of new bodies at our Buffalo plant for shipment to western points, and at our Derby plant for shipment to eastern points. Production economies have enabled us to lower the price of new bodies.

2. To obtain a rebuilt body, a little time allowance is necessary. These are in constant demand, but if you can anticipate your requirement a few weeks in advance, a rebuilt body can be reserved for you from a number continually in process at our Derby plant. Rebuilt bodies cost less than new ones, but they carry the same guarantee.

At Farrel-Birmingham, the Banbury mixer is constantly being improved in design and materials. When you replace an old body with either a new or rebuilt one from Farrel-Birmingham, you gain the benefits of modern design improvements, plus the experienced and expert workmanship of the original builder of the machine.

When you need Banbury repairs or rebuilding, make sure you get the kind of job that will give you new Banbury performance. Call the Farrel-Birmingham office nearest you.

FARREL-BIRMINGHAM COMPANY, INC.
ANSONIA, CONN. (REgent 4-3331)
AKRON 8, OHIO, 2710 First National Tower (POrtage 2-8871)
CHICAGO 3, ILL., 120 South LaSalle Street (ANdover 3-6434)
LOS ANGELES 21, CALIF., 2032 Santa Fe Avenue (LUdlow 5-3017)
HOUSTON 2, TEXAS, 860A M & M Building (CApitol 2-6242)

Farrel-Birmingham®

FB-1043

In 1975, we'll still be Basic in Plasticizers
. . . AND YOU'LL STILL BENEFIT!

As a plastics manufacturer you already know the day-to-day benefits of buying plasticizers from a basic producer such as Pittsburgh: Complete quality control from coal to plasticizer . . . dependable uniformity of product . . . and prompt, reliable deliveries (perhaps even by helicopter tanker, as illustrated above, in future years!)

But perhaps you've overlooked this most important of all benefits our basic position offers you . . . and it concerns those *future* years. The development of our own raw material sources and plant equipment—from coke ovens to chemical plant—has been achieved over a period of many years, and by a considerable investment in capital and human effort. We have been building, and will continue to build for the future—in production capacity and in our constantly growing research program to provide you with better plasticizers at lower cost.

Don't *you* prefer to do business with a company you know will still be serving you well in 1975?

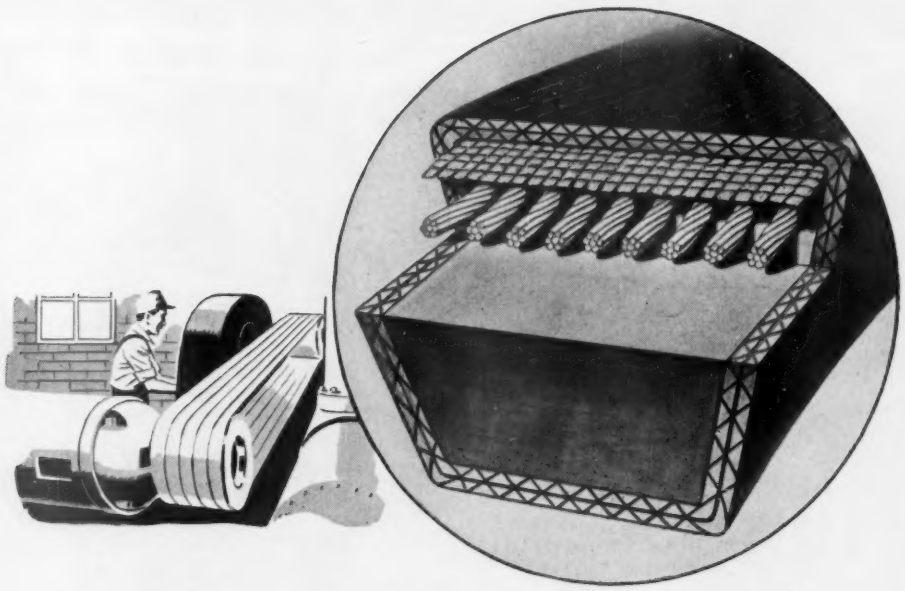
W&D 5780

PITTSBURGH *Job-Rated* PLASTICIZERS

PX-104 DiButyl Phthalate
PX-108 DilsoOctyl Phthalate
PX-114 Decyl Butyl Phthalate
PX-118 IsoOctyl Decyl Phthalate
PX-120 Dilso Decyl Phthalate
PX-138 DiOctyl Phthalate
PX-208 DilsoOctyl Adipate
PX-218 IsoOctyl Decyl Adipate
PX-220 Dilso Decyl Adipate
PX-238 DiOctyl Adipate
PX-404 DiButyl Sebacate
PX-438 DiOctyl Sebacate
PX-800 Epoxy
PX-917 TriCresyl Phosphate

PITTSBURGH COKE & CHEMICAL CO.

COAL CHEMICALS • AGRICULTURAL CHEMICALS • FINE CHEMICALS • PROTECTIVE COATINGS • PLASTICIZERS • ACTIVATED CARBON • COKE • CEMENT • PIG IRON



Why Thermoid Company uses Celanese* FORTISAN*-36 rayon in V-belts

Thermoid Company of Trenton, New Jersey, now uses FORTISAN-36, the new Celanese high tenacity, heavy duty rayon made from saponified acetate as the reinforcing cord in V-belts where severe stress is anticipated.

FORTISAN-36 has been found superior in both "performance" and "elongation" to competitive fibers.

Thermoid officials say "its 'performance' is considerably better than that of conventional fibers. Change of cord length throughout the belt life is practically infinitesimal, and is not affected by 'work' or atmospheric conditions."

FORTISAN-36 is presently being used for V-belts subjected to severe drives in automatic washing machines, power lawn mowers, passenger cars, trucks, and farm tractors.

If you have a stake in any of these areas—or are concerned with any industrial problem where high strength yarns are important—we'd like to work with you on the application of FORTISAN-36 to your products.

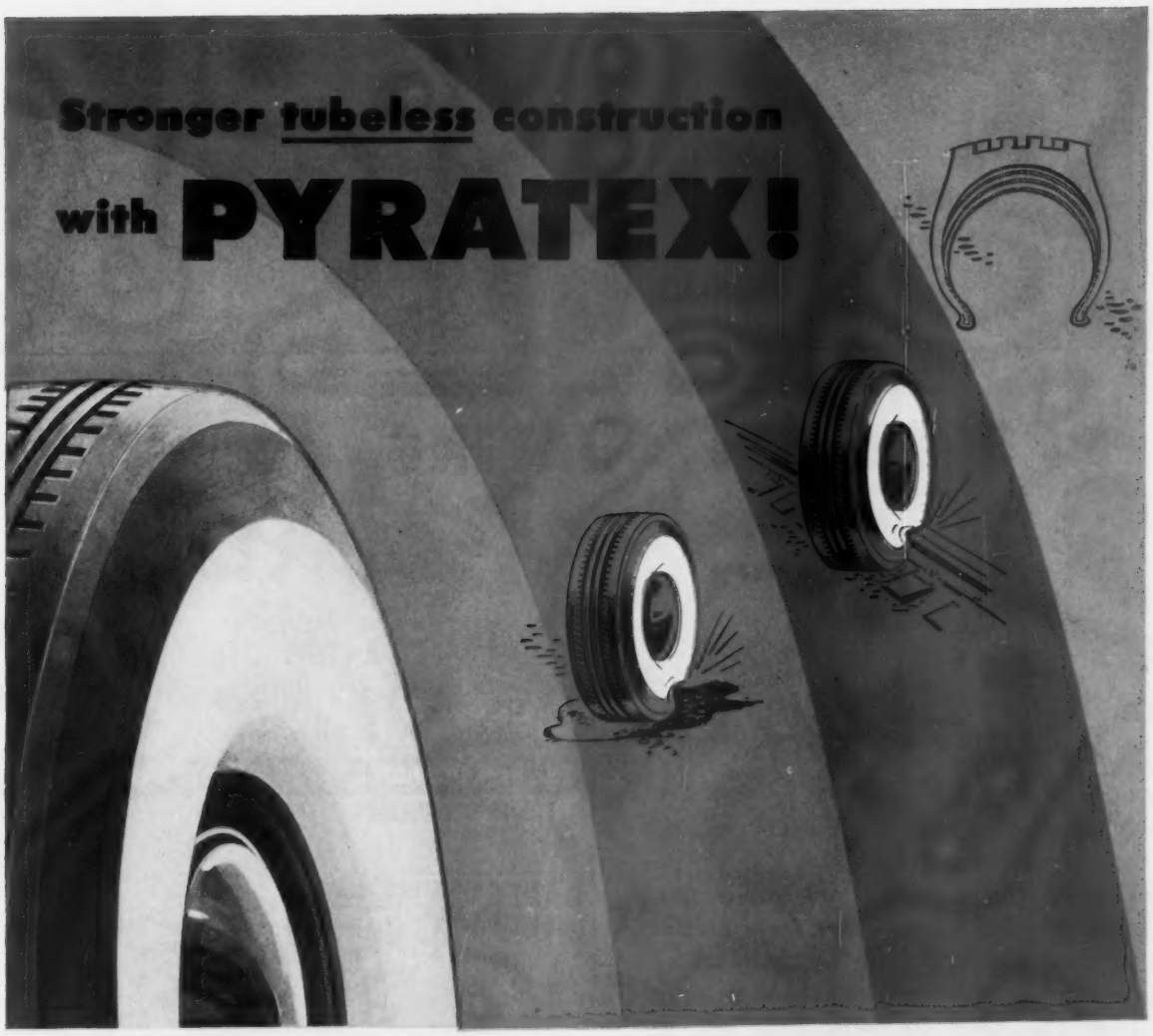
Our technical men have a wealth of data which may indicate some new approaches to you.

For further information, write for Booklet T. D. 20 to Celanese Corporation of America, Industrial Sales Department, Textile Division, Charlotte, North Carolina. Branch offices: 180 Madison Avenue, N. Y. 16, N. Y.; Pilgrim Square Building, 9 Overwood Road at West Market Street, Akron 13, Ohio, Telephone TE 6-2392.

*Reg. U. S. Pat. Off.

Celanese* Fibers for Industry

FORTISAN* RAYON • FORTISAN*-36 • ARNEL* TRIACETATE • ACETATE • VISCOSE-RAYON



PYRATEX INCREASES CORD-TO-RUBBER BOND UP TO 50%... strengthens tires against impact, and ply separation... helps make possible the popular new tubeless tires. Specifically developed to increase adhesion between rayon or nylon cord and rubber, Pyratex provides greater carcass strength.

A vinyl pyridine latex developed by Naugatuck, Pyratex will increase fatigue resistance and reduce ply separation in *all* reinforced rubber products. For superior performance in *your* automobile, bus, truck or airplane tires, V-belts, conveyor belts, or any other reinforced rubber product, *try Pyratex*. It is available for further compounding, or as a Lotol®, custom-compounded and ready for use.

For more information about how Pyratex can help improve *your* reinforced rubber products, write to us on your company letterhead, today.

PYRATEX...

- secures cord to rubber with a grip stronger than the stock itself
- keeps its outstanding adhesion under high-speed flexing and heat
- develops its adhesion more rapidly with cure
- greatly reduces "curing blows"
- has a higher solid content, for more convenient use

Naugatuck Chemical

Division of United States Rubber Company
Naugatuck, Connecticut

BRANCHES: Akron • Boston • Charlotte • Chicago • Los Angeles • Memphis • New York • Philadelphia • IN CANADA: Naugatuck Chemicals, Elmira, Ontario
Rubber Chemicals • Synthetic Rubber • Plastics • Agricultural Chemicals • Reclaimed Rubber • Latices • Cable Address: Rubexport, N. Y.

A supplement to THE ACTIVATOR—the house organ issued by The New Jersey Zinc Company for over 15 years to aid the Rubber Industry in its use of Zinc Oxide.

PROPIONATE COATING ADDS NOVEL FEATURES TO ZINC OXIDE

Rubber compounders and production men alike, in recent years, have helped to write a new chapter in the book of zinc oxide knowledge. For they have found, as they increased their use of zinc propionate coated zinc oxide, that this pigment—Protox-166*—has some advantages not available in untreated oxide.

Several of those features of Protox-166 have been described in detail in previous issues of ACTIVATOR NEWS, and others will appear here later. For your convenience, the list of such properties is shown in the attached table. If you have not yet evaluated Protox-166 in your compounds, we shall be glad to send you samples.

PROTOX-166 GIVES YOU ALL THESE ADVANTAGES

(COMPARED WITH ZINC OXIDES NOT OF THE PROTOX TYPE)

FEATURES OF PROTOX-166	HOW YOU PROFIT
LOWER DRY BULKING	LESS STORAGE SPACE LARGER BATCHES MORE OUTPUT
LOWER MOISTURE PICKUP	FASTER MIXING
ORGANOPHILIC COATING	QUICKER INCORPORATION BETTER DISPERSION LOWER POWER CONSUMPTION EVEN ACTIVATING AMOUNTS SPEED MIXING OF CARBON BLACKS
SCORCH INHIBITION	MORE PRODUCTION
PLASTICIZING EFFECT	FASTER, SMOOTHER TUBING AND CALENDERING REDUCES DIE SWELL CUTS CALENDER SHRINKAGE GIVES COOLER-RUNNING STOCKS
HIGHER REINFORCEMENT	IMPROVED TENSILES BETTER TEAR RESISTANCE HIGHER MODULUS GREATER RESILIENCE
MINIMUM PROGRESSIVE CURE, EVEN WITH PERSISTENT ACCELERATORS	LONGER SERVICE LIFE

U. S. Patents 2,303,329 and 2,303,330

THE NEW JERSEY ZINC COMPANY

Producers of Horse Head Zinc Pigments

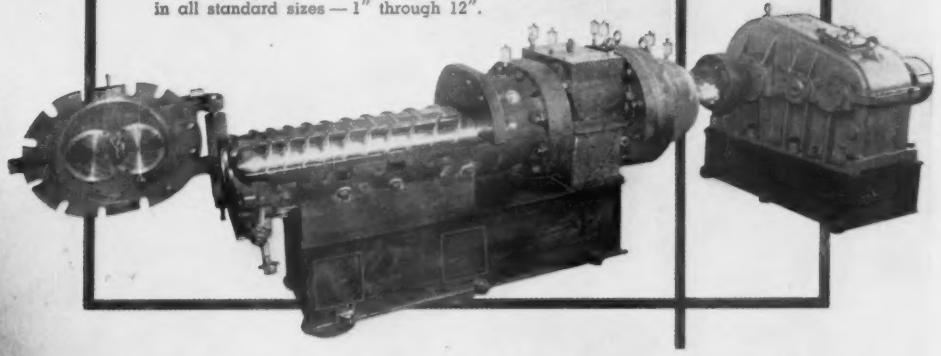
... most used by rubber manufacturers since 1852

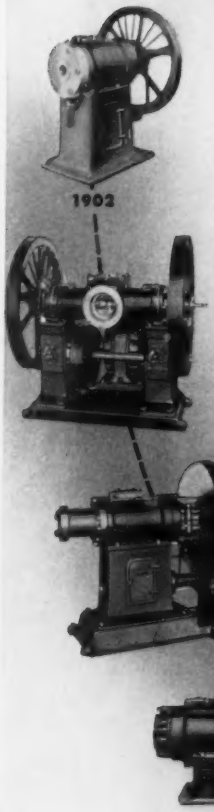
160 Front Street, New York 38, N. Y.

HORSE HEAD PRODUCTS

NE EXTRUDERS
for Rubber or Plastics

We make special extruders for either rubber or plastic in all standard sizes — 1" through 12".





Specials—our Specialty....

The National Erie line of extruders, now made by Aetna-Standard, a foremost builder of machinery, has been in existence since 1902. The NE line features custom-built extruders, not off-the-shelf models. When you need special extruders designed for your individual need, that's our specialty . . . Engineered Extruders.

Send your inquiry to Aetna-Standard's sales associates — Hale and Kullgren, Inc., 613 E. Tallmadge Ave., Akron 10, Ohio.

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We make and supply all types of servicing equipment for special extrusion processes, such as Reelers, Water Coolers, Capstans, etc.

Sales and Engineering by

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THE AETNA-STANDARD ENGINEERING CO., PITTSBURGH, PA.

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Chlorowax®

makes rubber products fire retardant

Chlorowax has been used extensively for adding fire-retardant qualities to rubber, paint, plastics, and other ordinarily combustible materials. Our technical staff has co-operated in many of these successful developments and will be glad to work with you.

Besides adding fire retardance, Chlorowax 70 can provide these additional benefits:

Reinforces GR-S, nitrile and neoprene polymers. Light color also makes it ideal for reinforcing white rubber stocks.

Plasticizer at rubber processing temperatures. Aids processing characteristics without bloom or exudation from the surface.

Aids faster incorporation of high pigment loadings. Chlorowax 40 functions effectively as a nonflammable rubber plasticizer.

For more facts on Chlorowax, write for new bulletin, *Chlorowax in Flame Retardant Rubber Compounds.* DIAMOND ALKALI COMPANY, Chlorinated Products Division, 300 Union Commerce Building, Cleveland 14, Ohio.

CHARACTERISTICS

	CHLOROWAX 70 (solid resin)	CHLOROWAX 40 (liquid)
Melting point	95-110 C	—
Particle size	90% through 50 mesh	—
Solubility in water	Insoluble	Insoluble
Toxicity	Non-toxic	Non-toxic
Odor	None	None
Chlorine content (%)	68-73	40-42
Viscosity (poises at 25 C)		20-28
Evaporation rate (gm per sq cm per hr at 100 C)	0.000004	

DIAMOND CHEMICALS

Diamond Chemicals

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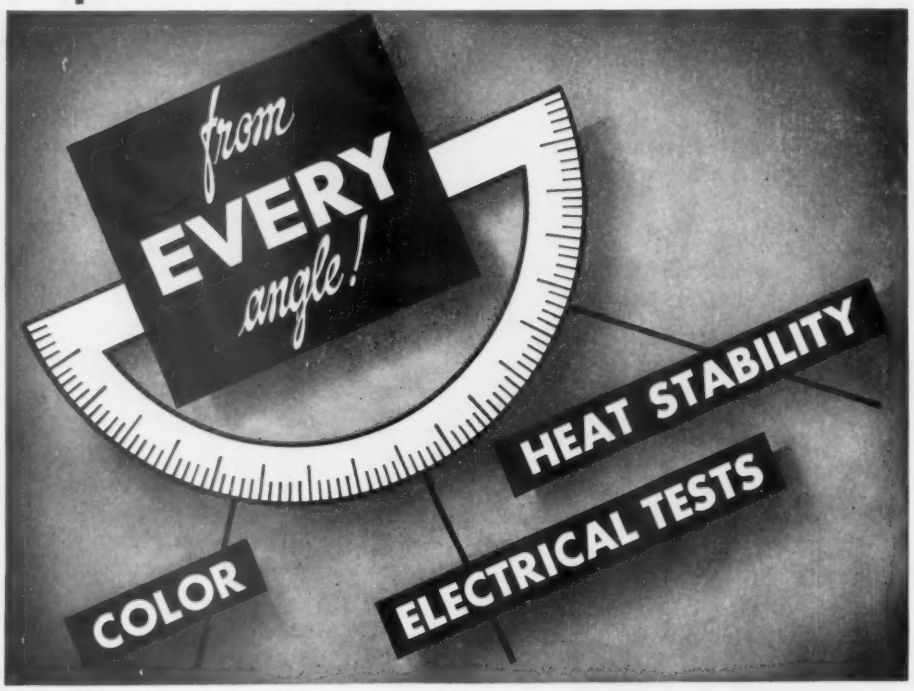

PIGMENT NO. 33

for Compounding

VINYLS AND SYNTHETIC RUBBER

Sample and technical data sent promptly on request

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How long did it take...
to get from here... to here?

ANSWER: 25 YEARS

With the introduction of hot water heaters in 1926 cars, motorists were beginning to roll in solid comfort during cold winter months. But research and development didn't stop there. Since 1951, air conditioning, at the touch of a button, provides year-'round spring temperatures despite weather extremes.

At the same time, the rubber industry was discovering new ways of making its products more versatile and longer lasting. Monsanto has played an important role in this development with its increasing number of rubber chemical products.

For example, Santocure NS, the newest Monsanto accelerator of the sulfenamide type, is characterized by even more delayed action, greater strength and full activity at curing temperatures. As an analogue of regular Santocure it is designed to meet the needs of present-day high-speed production which involves high processing temperatures.

For your copy of catalog "Chemicals for the Rubber Industry," write MONSANTO CHEMICAL COMPANY, Rubber Chemicals Dept., 920 Brown St., Akron 11, Ohio.

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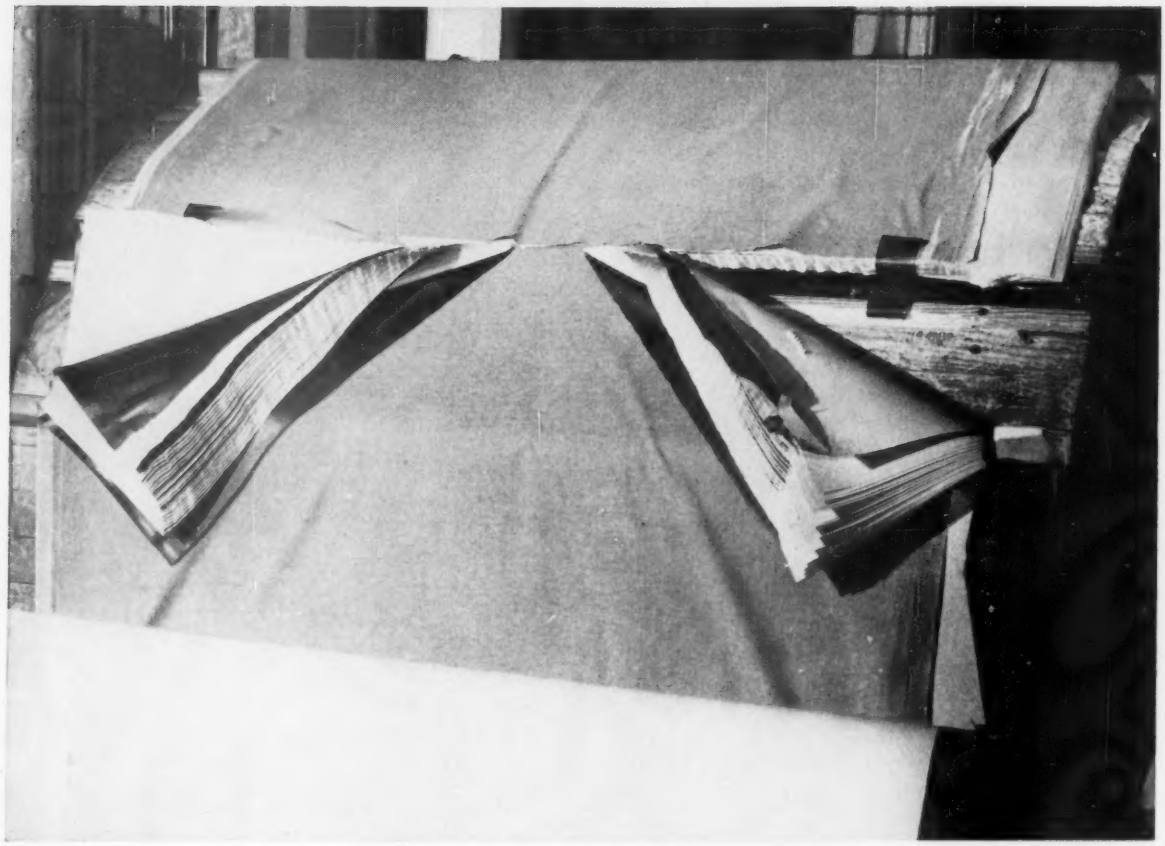

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Linerette separating paper plied up with frictioned stock before being cut in the clicking operation, saves time and money. Since 1925 Linerette, the specially processed separating paper, has been used with steadily increasing acceptance. It assures clean, fast separation without adhesion and contains no oil or wax. Here is how Linerette can help you:

Preserves tack.

Protects lightweight stock in shipment—no fabric needed.

Keeps stock free of cloth marks or impressions.

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Where cleanliness is essential, Linerette is a low cost lining for trays and containers.

Stocks can be calender-fed into it.

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Linerette is available in any width up to and including 54", in rolls of 9", 11½", 13" and 15" diameters, on cores of 3" i.d. The yield is approximately six square yards to the pound. A 9" roll contains 375 linear yards and a 15" diameter about 1150 linear yards. Ask for a sample today, just specify desired width.

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To learn more about using Sun Rubber Process Aids to get better physicals, lower costs, and easier processing, see your Sun representative. Or write for your copy of Sun's latest Technical Bulletin describing any of the above products. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. RA-11.

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In the early days of the rubber industry, the desire for color automatically meant that utility of the goods would be sacrificed to beauty. Reinforcing fillers capable of doing both jobs simply had not been developed.

Availability of Columbia-Southern's Calcene TM and NC, Silene EF, Hi-Sil 101 and 233 now gives any compounder a range of good physical properties and permits manufacture in any desired shade or tone. Columbia-Southern reinforcing pigments range from precipitated calcium carbonate through highly reinforcing silica, providing a versatility you can employ on almost any problem.

Let us know your objectives in colored rubber goods—there's a Columbia-Southern pigment (or a combination) that will fit your needs. Write or telephone today to Rubber Pigments Department at our Pittsburgh address.

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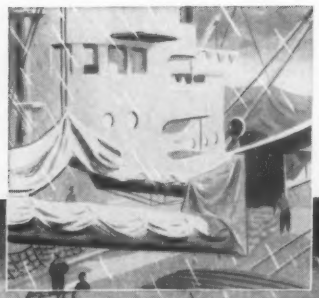
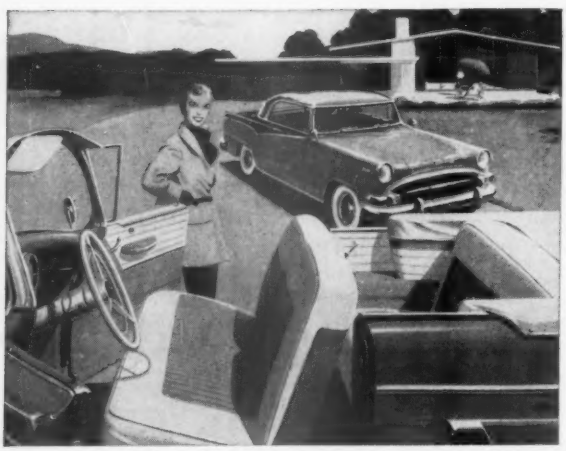


WELKOTE—Wellington Sears nylon backing fabric, when neoprene or vinyl-coated, combines light weight plus strength for a multitude of protective covering uses. Besides all-weather hatch tents for shiploading, these include playing field covers, machinery and freight tarpaulins, fumigation tents, etc.

Wellington Sears fabrics back up the versatility of these coated materials



For coated auto and furniture upholstery, luggage, handbags, wall coverings and many other end uses, Wellington Sears backing fabrics include cotton sheetings and drills, twills, sateens and ducks; spun rayon, "Welkote" filament nylon and other synthetics; "KnitKote" cotton knit fabric; "Lantuck" and "Lantuck-NR" (nylon-rayon) non-woven fabrics. All end-use "engineered."

American industry today is setting no limits to the possible uses of coated materials. And there's more to these materials than meets the eye. Beneath the colorful and serviceable surface, there is a backing fabric that provides the basic strength.

But there's still more to this "inside" story. Because of special problems of tear-strength, durability, flexing, weather resistance, tailoring qualities, adhesion and the like, this backing fabric must be carefully *engineered* for each type of application.

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Wellington Sears makes the backing fabric only—not the finished coated product. So, if you have a coating problem—or any problem that involves fabric in combination with rubber or plastics—let our experience go to work for you. For booklet, "Modern Textiles For Industry," address Dept. G-11.

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Impart good processing and extrusion characteristics—minimize temperature build-up and deterioration under repeated impact.
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Stauffer has offered *special* Rubbermaker's Sulphurs for over three decades, constantly improving the fineness and surface properties to meet the demands of modern rubber technology. In addition, Stauffer has pioneered the commercial production of "insoluble sulphur" to prevent blooming prior to vulcanization.

Plants, offices, and warehouses coast-to-coast assure prompt handling of your requirements.

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Caustic Soda • Carbon Tetrachloride • Carbon Disulphide
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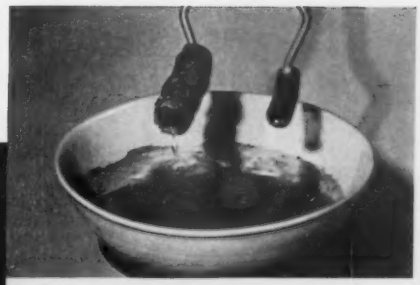
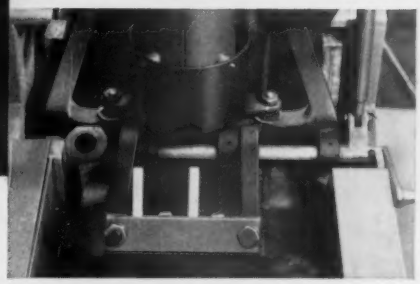
SILASTIC GUMS
give you 4 outstanding properties

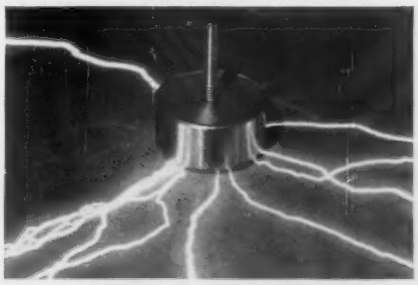


Stability at 500 F.



Elasticity at—100 F.

Minimum compression set over a span of 600 degrees



Excellent dielectric properties at Class H temperatures

Built-in low compression set — no toxic additives. Complete serviceability at temperatures ranging from —100 F. to 500 F. Excellent dielectric characteristics regardless of severe weathering, corona, ozone, heat or moisture. High tensile strength with silica fillers. These are the properties of *Silastic *Gums*, the Dow Corning silicone rubber gums that help you make better-performing products.**

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Easy-to-compound Silastic Gums reduce processing time, assure most efficient use of your mills, save capital investment in extra equipment. Dow Corning's 10 years of experience in compounding silicone rubber is at your service either in the field or at Midland, Michigan. You are invited to see first hand how to compound with Silastic Gums.

Complete line of silicone rubber RESEARCH materials available

Dow Corning offers the most complete line of silicone rubber gums to be found—sulphur vulcanizing, peroxide vulcanizing, fluid types. Always available in sample quantities.

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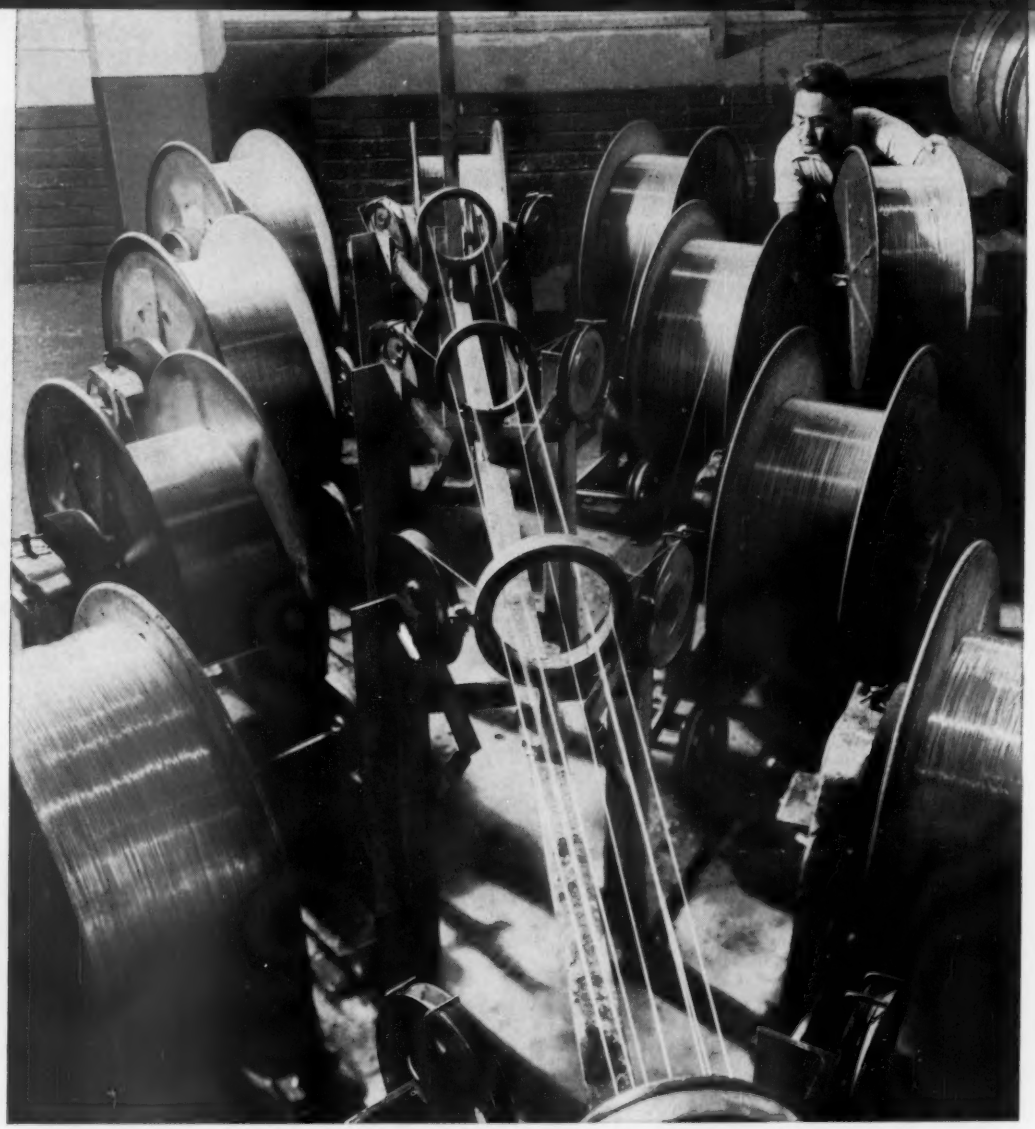
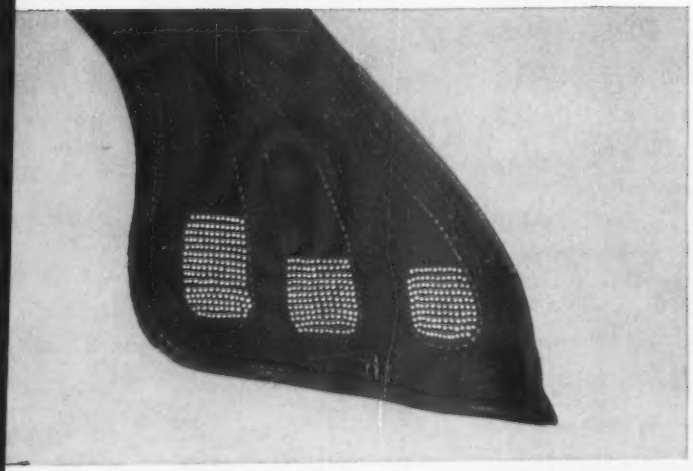
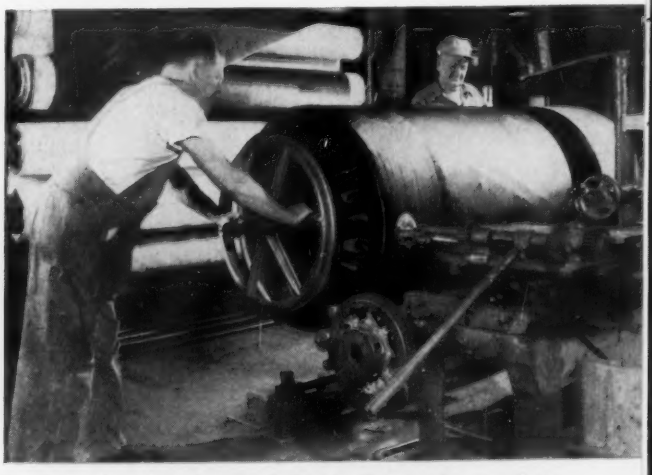


1. Steel Wire feeds smoothly into a bead building machine. The parallel wires are insulated with rubber to avoid wear between the wires, then wound into layers that build up into an engineered tire bead design.



2. Tire Beads for tires on heavy earth moving equipment are like those on your automobile, although they contain more wires for carrying heavier loads.



3. Becoming an Integral Part, the beads are first wrapped into a unit and positioned in the tire carcass, then built into the structure of the tire.

4. Samples Are Tested to make certain wire meets requirements for tire beads. Here the bronze coated wires are being tested under tension for proper adherence to rubber.

5. One of World's Largest Tires, made by Firestone for U. S. Army "Barc," is 9½' in dia., weighs 2,952 lbs. Tire is built to carry 60,000 lbs.

The Secret Strength of Tires

When they talk about "beads" in the tire industry, they don't mean ladies' jewelry. They're talking about the tough steel wires that anchor a tire to its rim.

Whether you're driving an automobile, an airplane, giant earth-moving equipment or anything that rolls on pneumatic tires, you are counting on the hidden bead wires to take up the full force of the load in starting, stopping or roaring across country. Tire beads transmit the load from the steel rim of the wheel.

If the cord body of your tire is damaged, you can have it fixed. But if the vital bead wires are broken, they can't be repaired. You have to replace the tire. So you are depending on tire bead wire to perform for you, and tire manufacturers insist on the best to do the job.

• **Design For Strength**—Busily producing thousands of tons of this wire going into tires made by every major tire manufacturer in the country are the experts of Johnson Steel and Wire Company. At Firestone Tire and Rubber Company, for example, their wire is going into some 60 different types of tires rolling off production lines by the millions every year.

It isn't ordinary wire. It is a special high carbon steel wire only 0.037 inch in diameter . . . so small that it takes about 274 feet of it to weigh a pound. Yet a single strand of this wire has a minimum breaking weight of over 285 pounds, equivalent to a tensile strength of approximately 270,000 pounds minimum per square inch. It has special requirements for torsion, elongation and straightness. In addition, it has a clean bronze plate finish so that the rubber in the tire will adhere to it.

Wires feeding into Firestone's bead building machines lie parallel, from three to twelve wires wide, depending on the engineered design of the bead. As they move rapidly through the machines, rubber completely encases them so that there will be no mechanical friction between wires.

Strands of coated wire come out of these machines looking much like a black tape. The tape is wound one turn on top of another until the bead reaches the required depth. Then it is wrapped with various types of fabric until it becomes a unit ready to be built into the structure of the tire.

• **Built To Take It**—The bead for a motor scooter tire is only three wires wide and three turns deep, giving you a bead containing a total of nine wires. Your automobile tire may have a six-by-five wire bead with a total of 30 wires. And, of course, there is one bead on each side of the tire. Air pressure inside the tire assures a snug fit of the bead against the rim.

Airplane tires have beads specially built for shock loading, as the tires must take the load of the plane and accelerate from motionless to rolling speeds of almost 200 miles per hour. These tires have up to three beads on each side, containing a total of nearly 500 wires per side and providing a breaking strength of over 140,000 pounds.

One of the largest tires in the world, built by Firestone for the U. S. Army "Barc," is 9½ feet in diameter. It weighs a ton and a half and its beads contain over 1,200 wires per side, giving a breaking strength of over 340,000 pounds.

• **Let 'Em Roll**—With the advent of the new tubeless tire, the use of tire bead wire and its importance to the tire industry are continuing to develop. Its uniform strength and rigidity offer ease and speed in manufacturing. Its adaptability to the necessary bead shapes through combination of strands gives the tire industry flexibility in design.

That's why you'll find Johnson Steel and Wire's tire bead wire used by Firestone and all the other blue-chip tire manufacturers.

If you use fine wire specialties, why not look into the opportunities Johnson Steel and Wire offers you. Its range includes aircraft cord wire, armature binding wire, wire for brushes, metal stitching, hose reinforcement, stapling wire, bobby pin wire, rope wire, oil tempered and MB hard drawn spring wire, and music spring wire right down to sizes as fine as a human hair. Why not call today. You can count on prompt personal service!

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a subsidiary of **Pittsburgh Steel Company**

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. . . an economical vulcanizing agent for heat-resistant, non-blooming stocks

VA-7 is a new liquid vulcanizing agent for all types of unsaturated elastomers. It provides economical "sulfurless" cures for nitrile, GR-S and natural rubber stocks.

Stocks compounded with VA-7 display an outstanding combination of heat aging resistance . . . high tensile strengths . . . good hot compression set resistance . . . and non-blooming characteristics in the cured and uncured states.

VA-7 also offers processing advantages — it can be dispersed more easily and uniformly than sulfur. Stable emulsions for curing latices can easily be prepared from VA-7.

The moderate price of VA-7 is another feature that makes this product worth your investigation. *Try VA-7 for heat-resistant, non-blooming stocks at reasonable cost!*

For compounding information and a sample of VA-7 fill out and mail the handy coupon.

CHECK LIST OF VA-7 PROPERTIES

Outstanding heat aging resistance.
Non-blooming in cured or uncured state.
High strengths at low concentrations.
Easy and uniform dispersion.
Good hot compression set.
Moderate price.

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and a sample of VA-7 ☐

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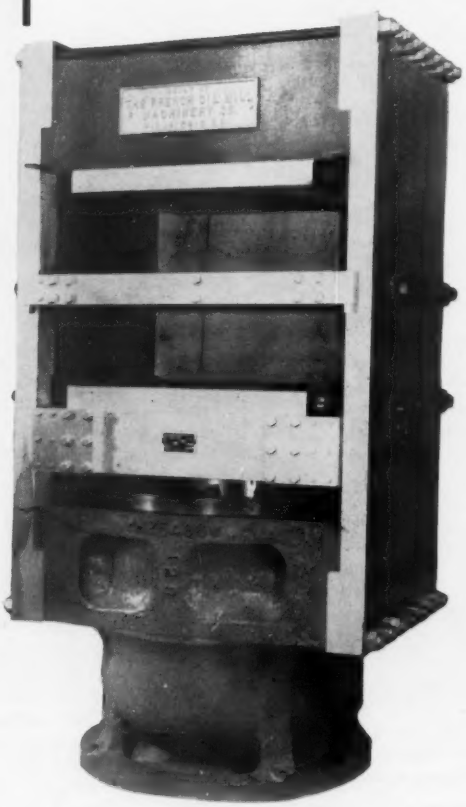
32" x 32"
Pressing Surface



The French Side Plate Press, with its patented constructions, is the finest available in the world, for compression and transfer molding. Rubber molders recognize this and specify *FRENCH* when *QUALITY* is needed.

IMPROVE CLOSE TOLERANCE MOLDING

LOWER MOLD MAINTENANCE

REDUCE PRESS DOWN TIME

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HARSHAW VINYL STABILIZERS

for the vinyl plastic and coating industries

Important additives for processing and stabilizing clear and opaque vinyls—

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RIGIDS AND FLEXIBLE
PLASTISOLS • ORGANOSOLS • COATINGS

CADMIUM 2-V-4

Leading heat and light stabilizer for clear or opaque stock, an organic liquid complex containing no disadvantageous soapy component. Unequalled for stabilizing against effects of sunlight or outdoor aging.

BARIUM-CADMIUM 128-V-5

Leading combination of coprecipitated laurates for outstanding performance, where lubricating advantages are required. Generally 30% more effective than common barium-cadmium laurates.

Write for a Vinyl Stabilizer Check List that you may use to detail as much as possible your particular requirements.

A practical stabilizing system will be suggested promptly, based on our experience with the various Vinyl Polymers and Copolymers and with the different Plasticizers, for your processing and product end-use requirements.

THE HARSHAW CHEMICAL CO.
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Best effects are attained for particular requirements by combining 2-V-4 or 128-V-5 in a stabilizing system with one or more of the following three stabilizers.

BARIUM 1-V-4

Compatible barium compound, minimum effect on viscosity. Permits processing at higher temperatures.

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Chelating agent, more than two times as effective as common organic phosphites. Inactivates harmful by-products to boost stability. Contributes to top clarity

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Epoxy assistant, highly effective HCl scrubbing agent, undiluted. Will extend stability for longer processing periods.

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For rigids, opaque to translucent. Stabilizes unplasticized resin efficiently and economically, with minimum effect on physical properties of product.

Stabilizing Systems developed for Harshaw Customers, for special processing and finished product properties, may contain one of the following stabilizers.

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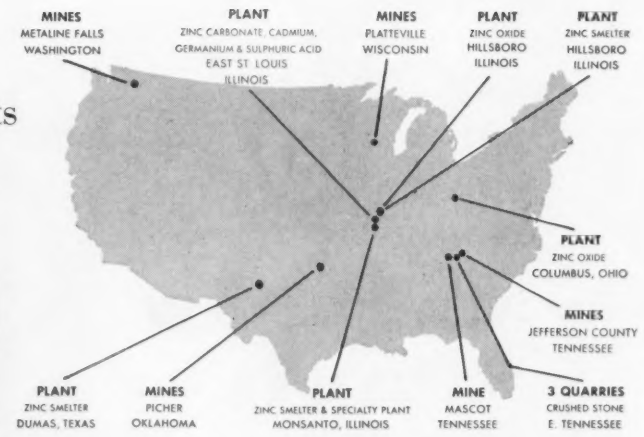
CADMIUM 22-V-1: For rigid, clear and opaque stocks.
ORGANIC 7-V-1: Epoxy assistant.
ORGANIC 7-V-4: Epoxy assistant, for rigids.
BARIUM 1-V-3: Dispersible stearate, to contribute lubricity with barium effects.
BARIUM 1-V-6: For asbestos filled tile.
BARIUM 1-V-7: Liquid, for modified plastisols and organosols.
CALCIUM 5-V-1: Dispersible stearate, to contribute with calcium effects.
CALCIUM 5-V-22: Dispersible, low melting stearate to reduce internal friction.
ORGANIC 8-V-100: Modified 8-V-1.

American Zinc and its products

from A *to* Z



CONCENTRATING MILL, MASCOT, TENNESSEE

One of the key factors in American Zinc's widespread mining and milling operations. In Tennessee, American Zinc also owns and operates mines in Jefferson County. It is here that one of the largest known reserves of zinc in the United States is found (in excess of 1,250,000 tons of recoverable zinc, proven, with additional large reserves indicated). Other company-owned and operated mining properties are located at Platteville District, Southern Wisconsin; Metaline Falls District, Eastern Washington; and Picher field of the Tri-State Area (Missouri-Kansas-Oklahoma). For the complete picture, see map above.

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with this Versatile

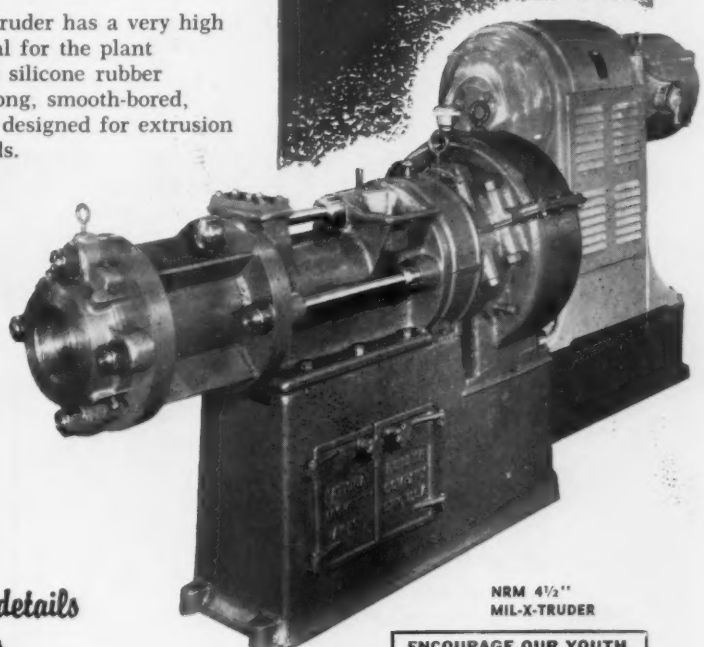
NRM

RUBBER EXTRUDER

For silicone rubber extrusion, this NRM Extruder can use either of two different types of cylinder liners — *extended* smooth-bore type, or *Mil-X-Truder*® fluted type. Both overcome the common problems of uneven screw feeding and fluctuating head pressures caused by the low-friction nature of silicone compounds. But more than that, each liner offers specific production advantages of its own . . . The Extruder — with cylinder liner selected to match predetermined extrusion requirements — will fit readily into your plant setup and assure trouble-free, economical production of top quality silicone rubber extrusions. Here's why:

WITH EXTENDED TYPE LINER the Extruder has a very high pounds-per-hour extrusion rate. It is ideal for the plant specializing in large volume, *continuous* silicone rubber production. The cylinder liner is extra long, smooth-bored, and houses an NRM feedscrew specially designed for extrusion of pre-warmed silicone rubber compounds.

WITH MIL-X-TRUDER® TYPE LINER the Extruder heats, mixes and extrudes silicone or any other rubber compound in a single operation, making it ideal for plants where various types of compounds must be extruded on one machine. Here, the cylinder liner is fluted, and houses a specially designed Mil-X-Truder® feed screw. The slower production rate of the Extruder with Mil-X-Truder® liner is far more than offset by these *plus* advantages: 1) It eliminates need of a separate warm-up mill, and 2) It accurately extrudes *any* rubber compound with equal ease.



NRM 4½" MIL-X-TRUDER

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on this Extruder, equipped with the cylinder liner that matches your rubber, or silicone rubber extrusion requirements. No obligation.

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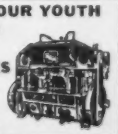

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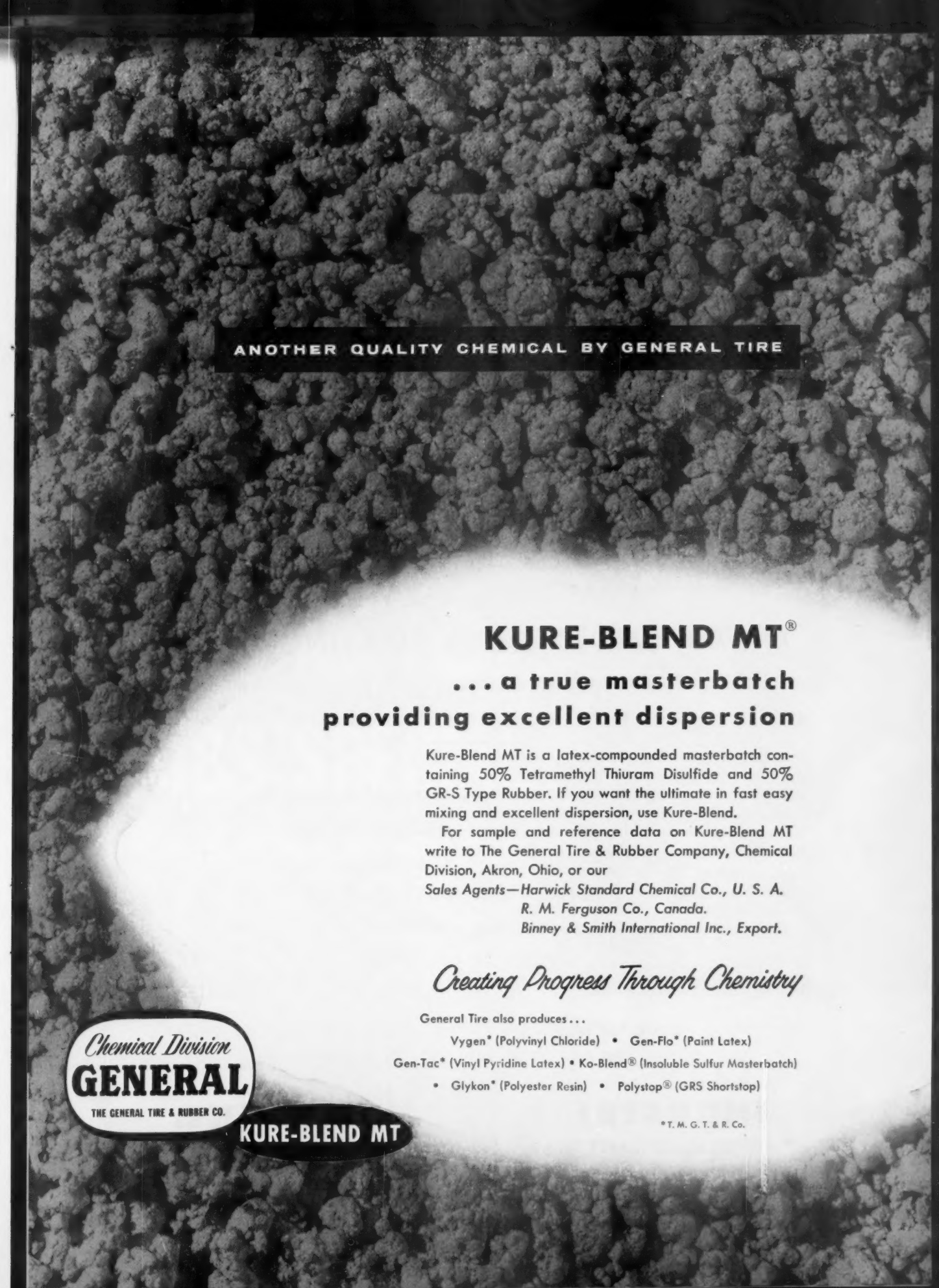
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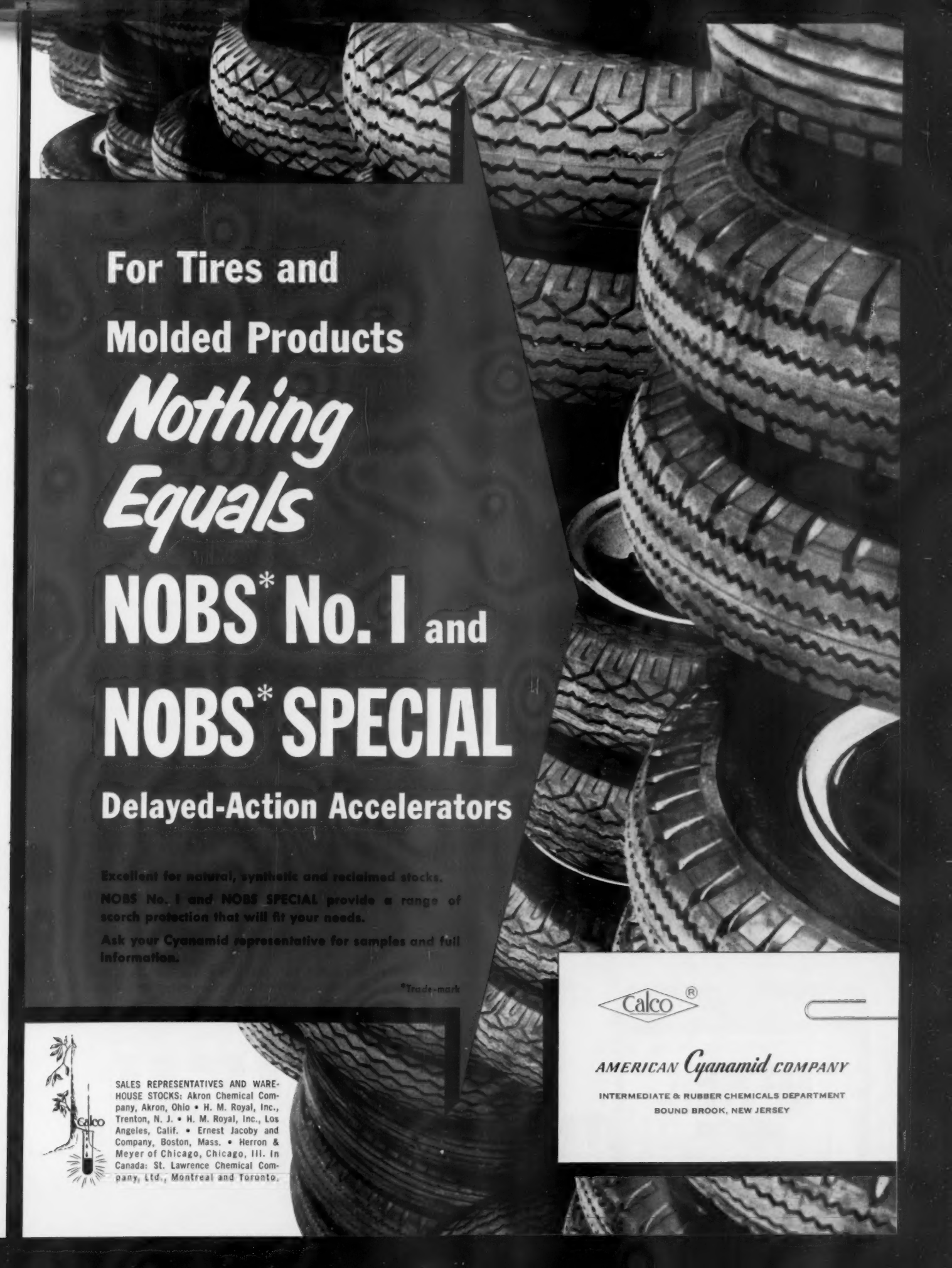

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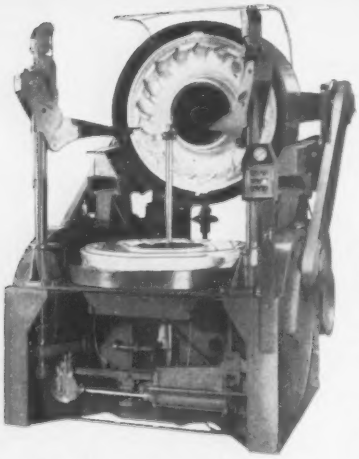
PROVEN IN TIRE PLANTS

A battery of 55-inch Twin Tilt Back Bag-O-Matics speeds curing of truck tires.



Model 900-75-25D Tilt Back Bag-O-Matic has 900,000 pounds holding pressure on the mold.

BETTER, EASIER, SAFER AND FASTER CURING OF

McNEIL-AKRON TILT BACK

With the new McNEIL-AKRON Tilt Back Bag-O-Matic Presses, manufacturers of truck and off-the-road tires can now have all the advantages of the Bag-O-Matic principle. This is the same proven technique that has lowered production costs while improving the quality of passenger tire manufacturing throughout the industry.

The greatest advantage is the substantial reduction in curing time.

Other advantages realized from the use of these Heavy Duty Bag-O-Matic Presses may be summarized as follows:

BETTER CURING—Automatic, accurately controlled curing temperatures and time cycles.

EASIER OPERATION—Complete access to center mechanism and mold areas for mold changing, bag replacement, green tire placement and cured tire removal by means of overhead handling equipment.

THE NAME TO REMEMBER FOR PRECISION

McNEIL AKRON

Manufacturers of the World's Finest Rubber Curing Equipment

THE McNEIL

The World Over --

Model 450-55 16D Tilt Back Bag-O-Matic has 450,000 pounds holding pressure on each mold position.

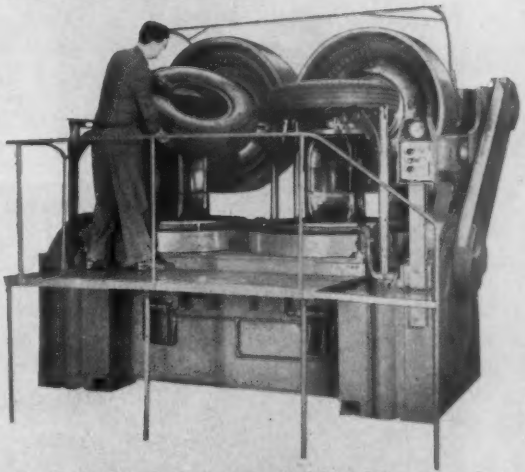
TRUCK AND OFF-THE-ROAD TIRES with

BAG-O-MATIC PRESSES

SAFER OPERATION—All of the proven McNeil safety features including safety bars and pressure switches are incorporated to provide complete operator protection.

FASTER PRODUCTION—In addition to the faster, superior cures that result from the Bag-O-Matic process, McNeil-Akron Tilt Back Presses are designed for unequalled loading and unloading speed and for all-around maximum production efficiency.

There are additional advantages, too, which make these units extremely desirable for your truck and off-the-road tire curing requirements.*



Tilt Back Bag-O-Matics are engineered for convenient, speedy and safe operation. Head tilts backwards 90° to facilitate laying of green tire and removal of cured tire via electric hoist. Design also makes it easier to change molds and Bag-O-Matic "ring and bag" assemblies.

*12.00 x 20 maximum size in 55" press, and up to 18.00 x 24 in the 75" press.

MANUFACTURING AGENTS: Francis Shaw & Company, Ltd., Manchester, England; Vickers-Ruwolt Proprietary, Ltd., Victoria, Australia; Luigi Pomini, Soc. in Acc. di Luigi e Carlo POMINI fu Egidio e C, Castellanza, Province of Verese, Italy; Etablissements Repiquet, Bobigny (Seine), France; Harburger Eisen Und Bronze-Werke A. G., Hamburg-Harburg, Germany.

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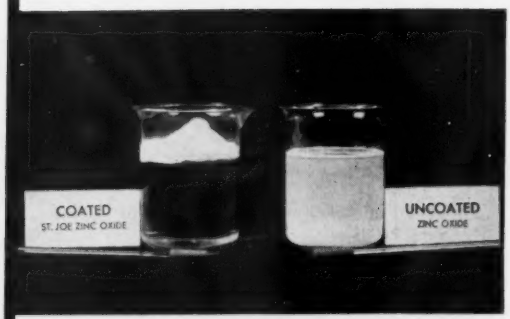
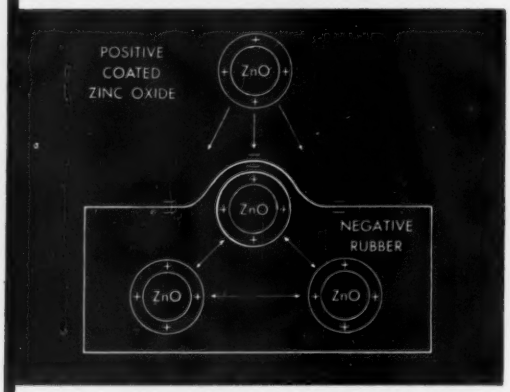


above: Graphic illustration of the hydrophobic nature of the surface treatment given all St. Joe coated Zinc Oxides which indefinitely resist wetting when placed in contact with water. This unique property of St. Joe coated Zinc Oxides guarantees to the consumer maximum resistance to moisture absorption during storage.



above: The monomolecular film or hydrophobic, high molecular weight organic ester on St. Joe's coated Zinc Oxide has a more positive charge than that of rubber. Thus, the rubber has a greater affinity for St. Joe's coated Zinc Oxide than for uncoated pigment with consequent reduction in incorporation time. The repelling force of the positively charged film on the zinc oxide particles themselves gives improved dispersion in less time by preventing agglomeration.

that's the success story of

ST. JOE coated ZnO

ST. JOSEPH LEAD COMPANY — ST. JOE ZINC OXIDE — JOSEPHTOWN, PA.

BLACK LABEL #20-21
Fine Particle Size

GREEN LABEL #42-21
Medium Particle Size

Do what 85 other rubber manufacturers have done—make a factory test and prove to yourself these advantages of St. Joe coated Zinc Oxides:

1. Moisture resistant
2. Faster incorporation
3. Better dispersion
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5. Lower power consumption
6. Lower mixing temperature
7. Reduced storage space

note: All St. Joe Zinc Oxides may now be shipped as space-saving Unit-Loads. Our 6-page illustrated folder, containing detailed operating data on the St. Joe Unit-Load method is yours for the asking.

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Drug Sundries
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are Manufactured by
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Write for complete technical data on these resins.

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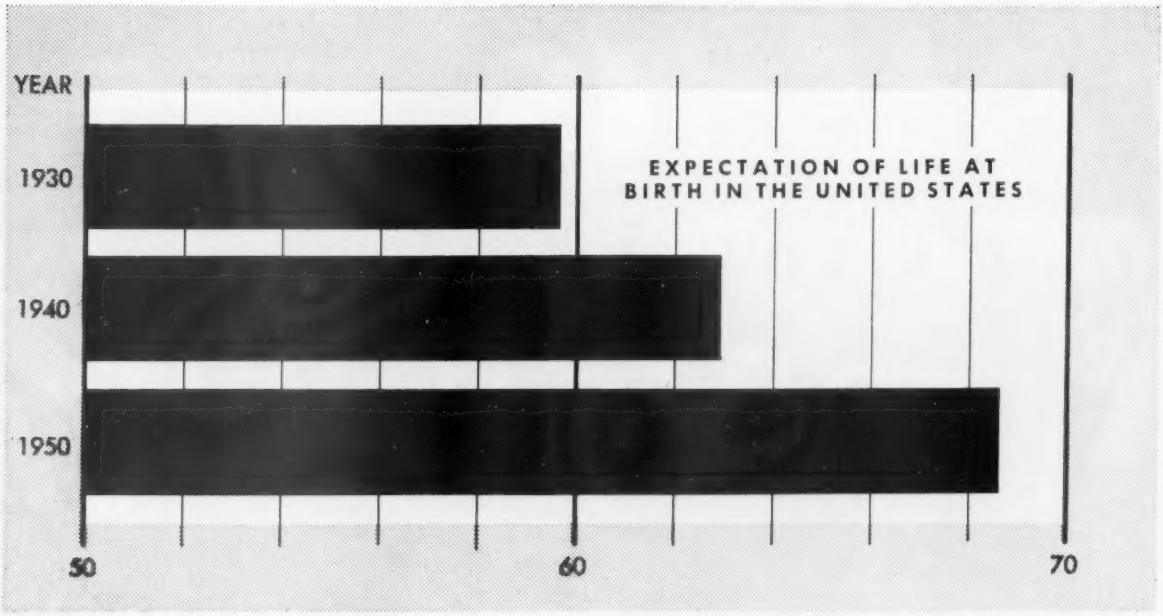

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Plastics made with HARFLEX® 300 as the sole plasticizer have a given tensile strength with the use of less material, are non-migratory, and have excellent low temperature properties.

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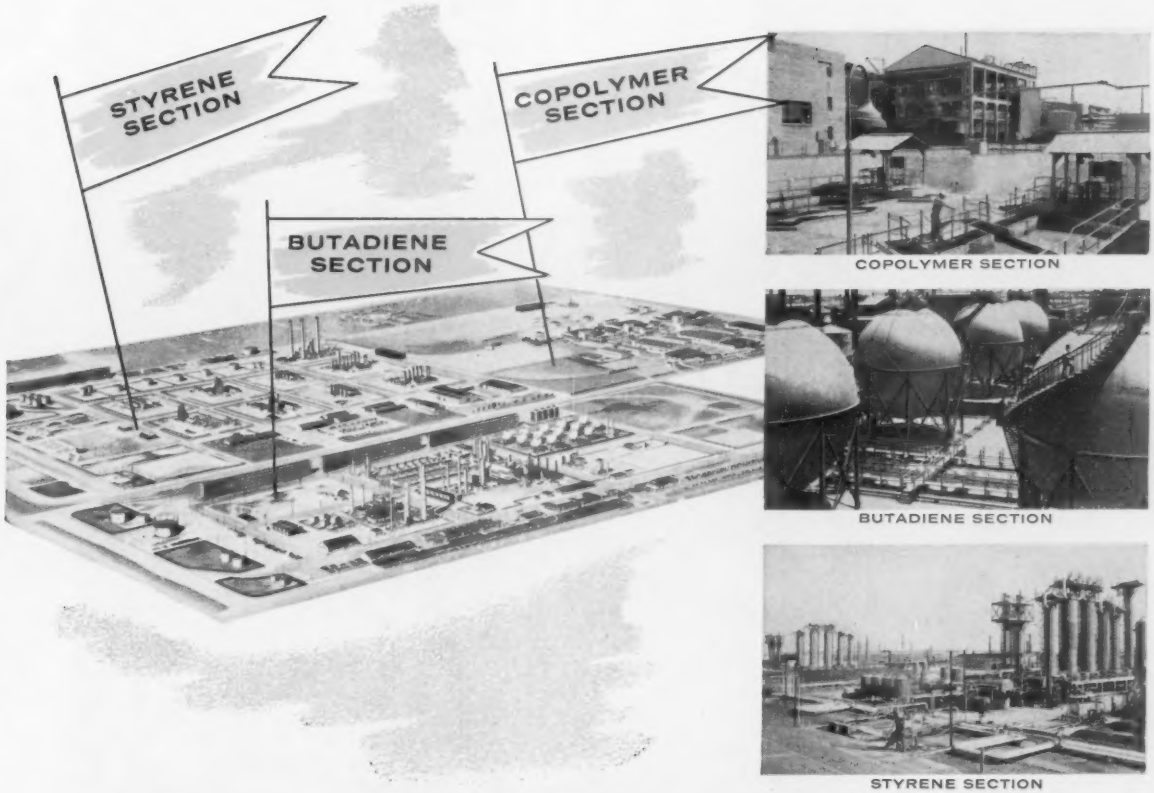

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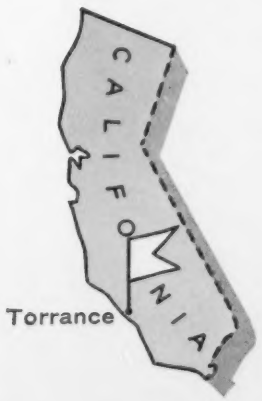
Synthetic Rubber



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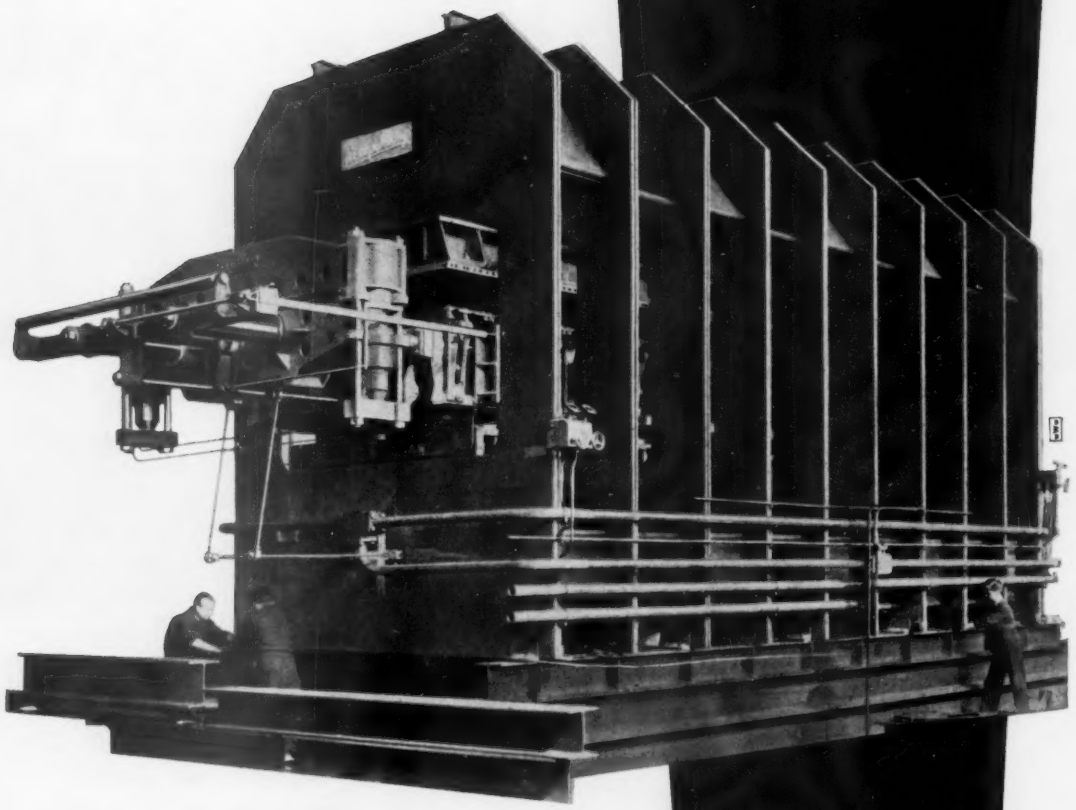

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Dimensions up to 10 feet wide by 50 feet long

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PHILLIPS CHEMICAL COMPANY
Rubber Chemicals Division
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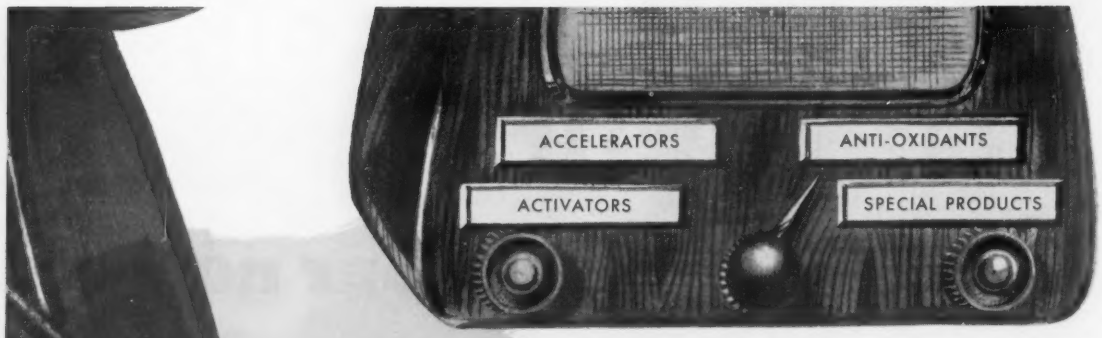
Phillips 66



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answers all your rubber chemical problems

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Rubber Age

Vol. 78, No. 2 NOVEMBER, 1955

Polyester-Urethane Foams

A Preliminary Survey of Formulation Factors

By ROBERT P. HOPKINS

Research Laboratories, Rohm & Haas Co., Philadelphia, Penna.

MAN'S universal and perpetual desire for comfort has prompted the development and utilization of many different materials upon which he can lie or sit. Among the more recent products designed to contribute to the art and science of relaxation is foam rubber which, because of its unusual resiliency and flexibility, has gained wide-spread acceptance. Now, almost overnight it seems, foam rubber finds its position challenged by a formidable opponent having a formidable name: polyester-urethane foams or, as they are sometimes called, polyurethanes. Other designations are polyester foams, polyester-isocyanate foams and isocyanate foams. Terminology, it is apparent, is not yet standardized.

The extent to which the properties of polyester-urethane foams can be varied by manipulation of the chemical constituents—isocyanates and polyesters—is remarkable. Foams can be made which are soft or rigid, for example. Density can be varied widely. Unlike rubber latex foam rubber, polyester-urethane foams are flame-retardant, resistant to degradation by ozone and ultraviolet light, and withstand quite well laundering and dry cleaning. Polyester-urethane foams are tough enough to be sewn. Because of their chemical inertness, they are virtually odor-free. And, highly advantageous, they can be foamed in place, providing the user with a pleasant, unexpected "do-it-yourself" option.

Because the polyester-isocyanate system lends itself so readily to variation of formulation and, hence, to variation in the properties of the final foamed product, a knowledge of the effect of the variables of formulation upon the foam produced is helpful. Likewise, the variables of processing should preferably be understood. A study of the former belongs to the chemist; the latter to the engineer. The viewpoint of the chemist, based on investigations conducted in the Rohm & Haas laboratories, is adopted here.

As indicated by Grinsfelder *(1)*, research is often facilitated by properly designed experiments. The complexities of formulation of polyester-isocyanate systems beg for experimental design. But before such experimental work is considered, however, some discussion of the chemical reactions involved in the production of isocyanate-polyester foams is a prerequisite *(2)*.

Chemistry of the Polymer

A highly important step in the formation of polyester-isocyanate foams is the build-up of polymer, or chain elongation, which results from the reaction of isocyanate groups with the polyester, itself a material of high molecular weight. This reaction, actually one between the hydroxyl-terminated polyester and an isocyanate, such as toluene diisocyanate, is shown in Figure 1.

The formation of foam by reaction of the isocyanate group (NCO) with water, which liberates carbon dioxide, is another important step. Two polyester-isocy-

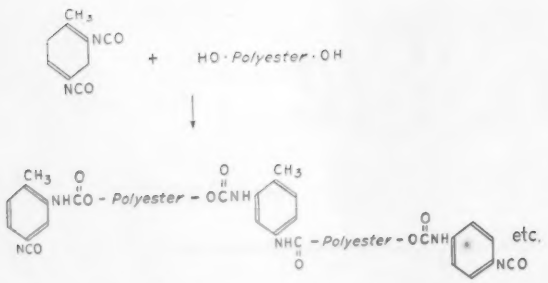

FIG. 1—Polyester-urethane isocyanate.

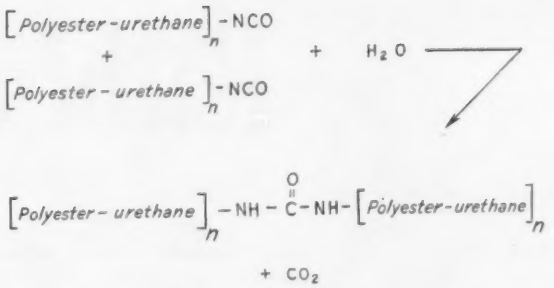

FIG. 2—Urea derivative (water cross-linkage).

anate chains, each possessing an unreacted isocyanate group, react with one mole of water. Here, also, as shown in Figure 2, cross-linking occurs involving a urea derivative, which is formed simultaneously with the carbon dioxide. Additional cross-linking from the reaction of the urea group with residual isocyanate (Figure 3) also occurs.

The reactions involved in the formation of polyester-isocyanate foam are complex. They become even more complex when consideration is given to the various reaction rates of different polyesters and the differences in reactivity of the isomers of toluene diisocyanate (2,4 and 2,6).

Factorial Study

A 3 x 3 factorial was arranged to determine the gross variations made possible by variation of (a) the amount of a given grade of toluene diisocyanate used and (b) the amount of water. At each of three ratios, 2.0, 3.0, and 4.0, of the number of equivalent weights of TDI (toluene-diisocyanate) to polyester, were studied the systems in which the ratios of the number of equivalent weights of residual TDI to water were 1.0, 0.5, and 0.25 (after allowing for theoretical stoichiometric reaction with the hydroxyls of the polyester). Thus, nine foams in all were investigated.

The equivalent weight of water in these formulations was taken to be 9; that of toluene diisocyanate 87. For the particular batch of Paraplex U-148 used the equivalent weight was calculated to be 780. A typical formulation, representing the center specimen of foam in Figure 4, is:

Raw Material	*Weight in Grams*	*Number of Equivalent Weights*
Paraplex U-148	39.00	0.05
Toluene diisocyanate (80:20, 2,4:2,6 isomers)	13.00	0.15
Water	1.80	0.20
Diethyl ethanolamine	0.16	—
Dow Corning DC-200 (500 centistokes viscosity)	0.10	—

The ratios of the number of equivalent weights are calculated thus:

$$\text{TDI to polyester: } \frac{0.15}{0.05} = 3.0$$

$$\text{Residual TDI to water: } \frac{0.15 - 0.05}{0.2} = 0.5$$

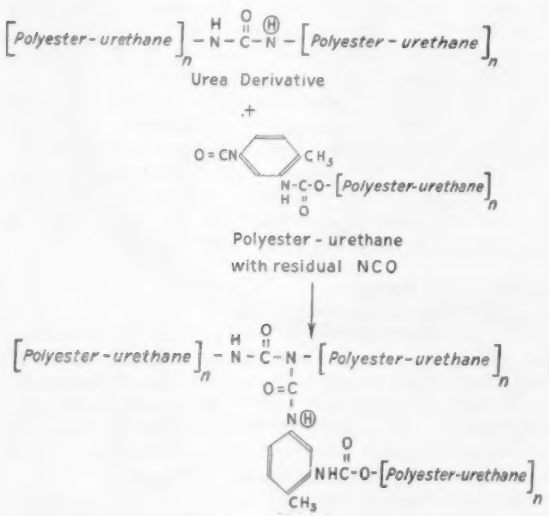

FIG. 3—Cross-linked polymer.

Figure 4 shows how the volume and appearance of foam are affected by variation in the ratio of the number of equivalent weights of TDI to polyester and the ratio of the number of equivalent weights of residual TDI to water. (Hereafter, the term "number of equivalent weights" will be omitted in discussions of ratios, although the term is always implied). Unsatisfactory products are obtained at a ratio of 2.0 of TDI to polyester at low levels of water content. At the ratio of 0.25 residual TDI to water, foams are satisfactory, although at a ratio of 1.0, a relatively good foam is not obtained unless as high a ratio as 4.0 of TDI to polyester is used. The foams illustrated in Figure 4 commend the qualitative factorial as an aid in selecting potential "workable zones" for further quantitative study.

Figure 5 contains a summary of the data on density and compression modulus obtained with Paraplex U-148. These data are relative in the sense that variations in the processing of urethane formulations (mixing, curing, etc.) strongly influence the final properties of the foams produced.

All the data on compression modulus or load deflection were determined on round specimens, one square inch in area by one inch high, by use of an Instron testing machine. The area of the compression foot on the jig used on the machine was approximately one square inch. Because of the very high density or otherwise poor condition of the foam prepared having a ratio of TDI to polyester of 2.0 and a ratio of residual TDI to water of 1.0, it was not subjected to compression testing.

The dominant effect of the concentration of TDI on density is evident, although the concentration of water,

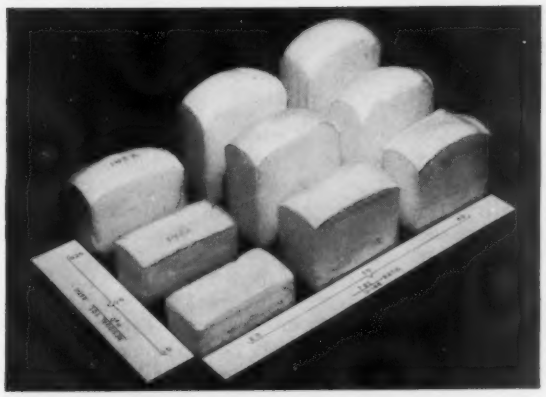

FIG. 4—Effect of ratio of TDI to polyester and ratio of residual TDI to water upon the volume and appearance of foams.

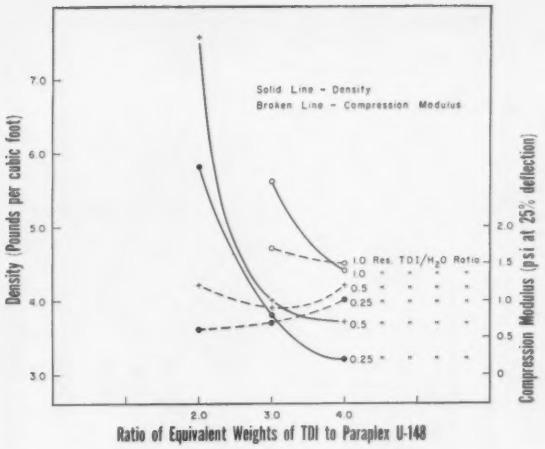

FIG. 5—Effect of TDI and water on density and compression modulus.

while a secondary factor, is nevertheless influential. In the more commonly studied systems, where the ratio of TDI to polyester ranges from 3.0 to 4.0, an increase in the concentration of TDI serves to decrease the density and increase the load bearing strength of the foam. This effect, however, depends upon the procedure used to prepare the foam. Here, the water was added after the addition of the diisocyanate (procedure 1, Figure 6). The opposite effect is observed when the diisocyanate is added last (procedure 2). The data plotted in Figure 10 were obtained by the latter procedure. If, in an attempt to decrease density, the concentration of water is increased, corresponding to a reduction in the ratio of residual TDI to water of 1.0 to 0.25, the compression modulus of the foam will be decreased.

The extent to which water can be used to produce lower density and softer foams (lower load bearing strength) is limited by interaction between the concentrations of TDI and water. At a ratio of TDI to polyester of 3.0, the effect of water on the decrease of compression modulus is more apparent than at the higher 4.0 ratio.

The above observations illustrate an important advantage of complete factorial designs: interactions which qualify generalizations are easily determined. Pertinent, as well, in setting up a subsequent experimental design for the TDI-polyester system, is the need for investigating the ratios between 1.0 to 0.5 of residual TDI to water because of the gap in the data, particularly in the ratio range of 3.0 to 3.5 of polyester to TDI. Also the value of combining experimental design with graphic presentation of results is evident. In studies of gross effects of formulation, such as are described herein, the procedure provides a good appreciation of the relative importance between factors as well as of different levels within a factor. The technique in which statistical designs are used in combination with graphic presentation of the data is emphasized in this article.

Directly associated with density is cost. If one assumes a price of $1.20 per pound for a particular grade of toluene diisocyanate and a price of 58¢ per pound for polyester, the relative raw material costs per cubic foot may be plotted, as in Figure 6, for the foam densities shown in Figure 5. The reduction in cost achieved through an increase in the more expensive ingredient, TDI, as a result of density reduction, is readily apparent. In order to provide some perspective of the importance of processing variations (as well as formulation), the costs of foams prepared by a second procedure are also plotted. The desire of industry to achieve flexible urethane foams of low density is explained by the data.

The foams in the 3 x 3 factorial were subjected to the ASTM Method B test for compression set normally applied to rubber foam. The samples in which the ratio of residual TDI to water is 0.25 show excessive set, as indicated by Figure 7. On this basis alone, such relatively high water contents were eliminated from further consideration.

The ASTM test applied to urethane foams made in our laboratory is open to wide interpretation, although it has been reported to be an accurate accelerated test

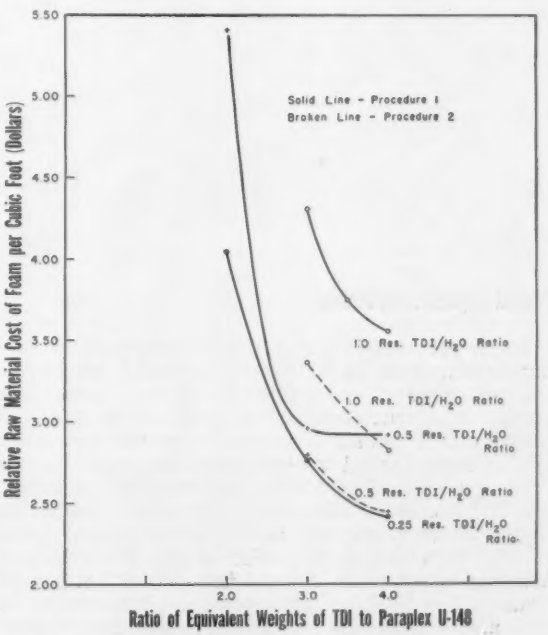
Solid Line - Procedure 1
Broken Line - Procedure 2
Relative Raw Material Cost of Foam per Cubic Foot (Dollars)
1.0 Res. TDI/H2O Ratio
1.0 Res. TDI/H2O Ratio
0.5 Res. TDI/H2O Ratio
0.5 Res. TDI/H2O Ratio
0.25 Res. TDI/H2O Ratio
Ratio of Equivalent Weights of TDI to Paraplex U-148

FIG. 6—Relative cost of foams (Paraplex U-148-TDI).

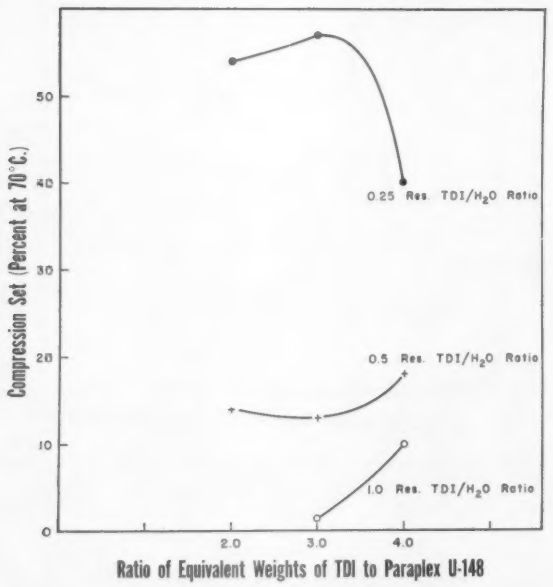

FIG. 7—Compression set data (ASTM Method B).

for rubber foam. Data accumulated in time-temperature studies on experimental foams made from toluene diisocyanate-polyester systems show little practical meaning when the ASTM Method B test is applied to them. In fact, the whole question of test methods and their development is receiving major attention in current research in these laboratories.

As the concentration of water is increased, gelation is found to become more rapid, especially between ratios of TDI to water of 1.0 to 0.5. Rate of gelation also increases with increased concentrations of TDI; for example, as the ratio of TDI to polyester is increased from 2.0 to 4.0. However, even the mixes high in diisocyanate are relatively slow setting at the lowest water content (ratio of residual TDI to water of 1.0).

It is also observed that rate of set is faster at the bottom of a foam four inches high than at the top, presumably because the reaction involving the addition of hydrogen to the double bond between nitrogen and carbon is sensitive to air. This effect, however, is not as pronounced as it is in the polymerization of vinyl monomers.

Second Experimental Design

In the previous design, emphasis was placed on finding concentrations of TDI and water which would permit the range of these variables in subsequent basic studies to be narrowed. As a result, a second experimental design was set up to include these two variables, but at more limited concentrations suggested by the original design. In addition, an important variable—the TDI isomer system—was incorporated. Finally, the design shown below was replicated five times. Three factors, therefore, were studied at two levels in such a way as to constitute a partial factorial, or 2 x 2 Latin Square. The combinations selected are indicated by X. The mirror image of this set-up, reserved for subsequent study where a complete factorial capable of picking up interactions is required, involves the formulations shown by the dash.

	80:20 2,4:2,6 TDI		65:35 2,4:2,6 TDI	
TDI to Polyester Ratio→	3.0	3.5	3.0	3.5
Residual TDI to Water Ratio				
1.0	×	—	—	×
0.75	—	×	×	—

Each datum reported for the above formulations in the subsequent evaluation of properties is an average of thirty observations.

It is especially important to realize the specific nature of the information provided by the Latin Square partial factorial employed. As noted in a previous reference *(1)*, this design seeks to determine the "main effects" or principal variables of formulation affecting a certain foam property. More practically, the design attempts to pick out what the important formulation factors are. How important the effects of these factors are depends on the particular combination of one important variable of formulation with one or more others. The statistician calls this "interaction," and requires a complete factorial to weigh its effects.

In the complete factorial already reviewed, water definitely influences the reduction of density and strength. How effective water is, however, itself varies in the presence of another important variable, the ratio of TDI to polyester. Generally, the deficiencies of Latin Squares on interaction are primarily apparent when an attempt is made to infer the result of a combination of a positive and negative effect. The example just cited, in which the concentrations of water and TDI are variables, is a case of this type, requiring the more thorough complete factorial design.

Solely from the standpoint of density (without regard to compression modulus), the TDI isomer system is seen to be an important factor affecting density, which decreases with increasing content of 2,4 isomer (Figure 8). As indicated in the graph of density data from the original design (3 x 3 factorial), density also decreases with increases in concentration of TDI (ratio of TDI to polyester). The amount of water corresponding to 0.75 and 1.0 ratios of residual TDI to water has a secondary effect on density compared to the first two factors, that is, relative amounts of 2,4 isomer and ratio of TDI to polyester.

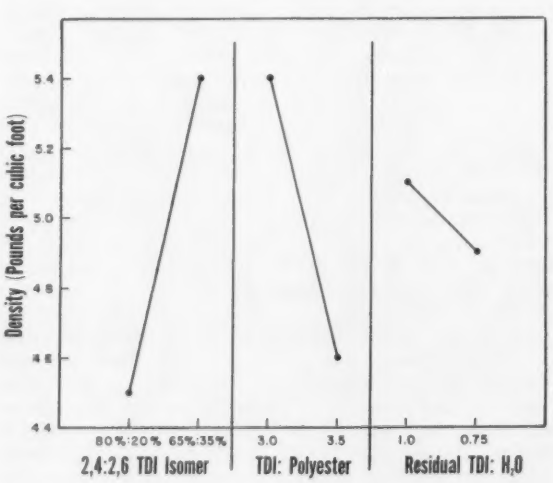

FIG. 8—Relative effect of TDI isomers and TDI ratios on density.

Stress-Strain Behavior of Foams

As compared to vinyl or rubber foams, the mechanical properties of flexible foams based on toluene diisocyanate and polyester reaction products constitute their most distinctive characteristic. Figure 9 emphasizes this distinction via typical stress-strain compression curves for foams based on urethane and rubber. As indicated, these stress-strain curves determine the load-bearing properties of the foams at different deflections, so that the term "compression modulus" applies to the property measured.

For rubber foam, the linearity of the data has been responsible for single point descriptions of the load bearing properties. Standard R.M.A. specifications, for example, use the load bearing value at 25 percent deflection to describe the compression strength of rubber foam. The stress-strain curve of polyester-urethane foam, however, is notably lacking in linearity. For this reason, load values at a given deflection cannot be simply extrapolated or interpolated, as they can with rubber foam, within a range of 0 to 50 percent deflection. (A second reason why data on urethane foam cannot be extrapolated indiscriminately will be discussed later.)

Before the influence of variables of formulation on stress-strain behavior is discussed further, it is necessary to call attention to the important information contained in the data. (Measurements were made with an Instron tester, which plots deflection as the ordinate and load as the abscissa, the reverse of conventional rubber testing diagrams.)

(a) *Critical Deflection Point*—The straight line portions of the loading curves of polyester-urethane foams show a characteristic break at approximately 8 percent deflection. Thorough analysis of the stress-strain data indicates that the maximum deviation from this deflection value is ± 2 percent under the test conditions prevailing. This deflection value appears to be independent of the strength of the foam, and suggests a physical effect involving the polyester-urethane cell structure itself. If this is true, mechanical treatment of the foam at a specific state of cure could influence the shape of the curve (for example, help smooth it out).

(b) *Compression Decay*—If an attempt is made to repeat the loading curve immediately, an entirely different curve results. Subsequent immediately repeated loading curves differ insignificantly from the second curve. The variation between the first and second loading amounts to a decay or "drift" under initial stress.

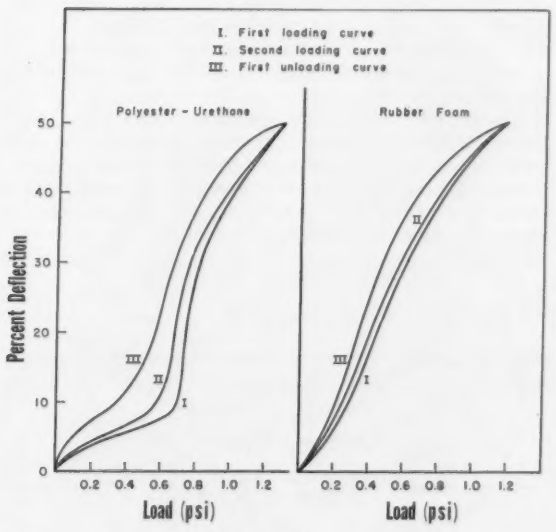

FIG. 9—Stress-strain behavior of foams of polyester-urethane and rubber.

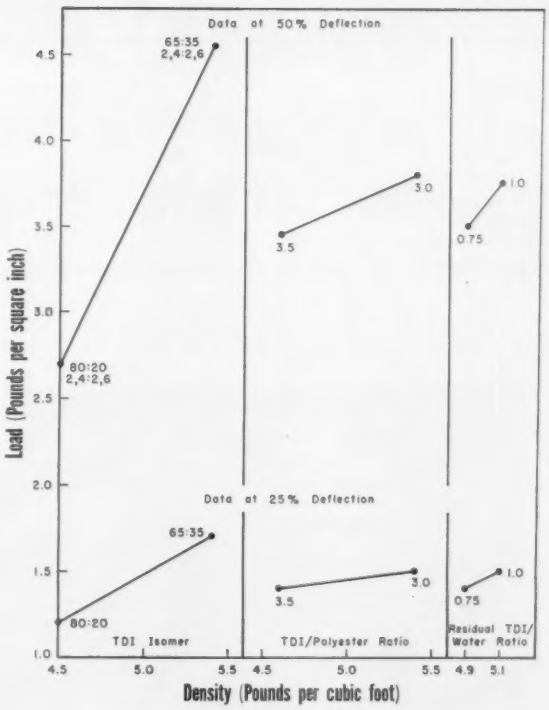

FIG. 10—Effect of variables of formulation on compression modulus.

(c) *Plateau Effect*—The lack of linearity of the stress-strain data derives from a change in slope of the loading curve at approximately 8 percent deflection. The ratio of the two slopes to each other is an index of the magnitude of this "plateau effect." The closer the ratio is to 1, the closer the foam approaches the almost linear stress-strain behavior of rubber foam.

(d) *Hysteresis*—The unloading curves for flexible polyester-urethane foam lag considerably behind the loading curves. The resulting hysteresis can be measured in terms of the areas under the loading and unloading curves. A somewhat less accurate but more simplified estimate of the hysteresis effect can be made by employing load values at 25 percent deflection. For example, hysteresis loss can be estimated quickly by dividing the difference between the 25 percent deflection load values for the first loading and unloading curves by the load value on the first loading curve.

The TDI isomer system is a very important variable influencing the strength (hardness or softness) of urethane foam (Figure 10). The amount of TDI used (ratio of TDI to polyester) is also important, but the change in strength with density is much more apparent in relation to the variation in TDI isomers. Changes in the water content corresponding to an increase in the ratio of residual TDI to water from 0.75 to 1.0 affect strength somewhat, but probably with respect to variation in density only.

Where low density and low load-bearing strength (foams of low compression modulus, or soft foams)

TABLE I—EFFECT OF VARIABLES OF FORMULATION ON PLATEAU, DECAY AND HYSTERESIS

	TDI Isomer System		Ratio of TDI to Polyester		Ratio of Residual TDI to Water	
	80:20 2,4:2,6	65:35 2,4:2,6	3.0	3.5	1.0	0.75
Plateau Index...	3.8	2.7	3.4	3.2	3.2	3.3
Decay Factor....	1.4	1.4	1.4	1.4	1.4	1.4
% Hysteresis....	57	57	56	58	55	59

are desired, the use of "80:20" TDI at a ratio of 3.5 of TDI to polyester is preferred to "65:35" TDI at a ratio of 3.0 of TDI to polyester. This deduction, involving a combination of two factors, is safe because two factors which give the same effect are combined. Only a complete factorial, however, could determine which of the other two possible combinations would be the better one.

The difference in slopes of the lines representing load as a function of density in Figure 10 for different formulation factors is a second reason why single point load values (e.g., at 25 percent deflection) cannot be used to judge the over-all strength of flexible polyester-urethane foams. A definite correlation can be established between deflection data at 25 percent and 50 percent for a given series of foams (e.g., TDI isomer series). Two series having different variables of formulation, however, and which have different slopes at 25 percent deflection, cannot be expected to have the same single slope at 50 percent deflection. Again, therefore, a polyester-urethane foam requires a stress-strain curve rather than a specific value to characterize the compression behavior of that foam.

The data in Table I summarize the other effects measured from the stress-strain data for the formulation factors under study. Their relative effect on the plateau may be conveniently described by a plateau index, arbitrarily calculated by dividing the second slope by the first. The higher the index the more pronounced is the plateau and the greater the deviation from the relatively linear stress-strain curve of rubber (index of approximately 1).

The TDI isomer system obviously influences the extent of the plateau, and the greater the content of the 2,4 isomer, the more extensive is this plateau. The ratio of TDI to polyester, on the other hand, exerts no easily discernible effect upon the plateau for the formulations studied; nor, for that matter, does an increase of 0.75 to 1.0 in the ratio of residual TDI to water.

There is an indication of some inverse relationship between density and plateau in the data on TDI isomer (higher density, smaller plateau). It is not consistent, however, as indicated by the data on the ratio of TDI to polyester.

Again, if a single number is employed in an attempt to show an effect observable in the stress-strain curves, a factor can be calculated by dividing the load at 25 percent deflection on the first loading curve by the corresponding value on the second curve. A factor of 1 indicates that the same value was obtained on both curves. The greater this ratio, the greater the difference or decay. The data in Table I show no effect attributable to the variation of any of the factors examined.

The concentration of water and TDI appears to have some effect on hysteresis, higher values deriving from an increase in either water or TDI. Within the range examined, however, the effects were minor. Variations in the ratio of 2,4 to 2,6 isomer (80:20 and 65:35) are not involved in the hysteresis of these polyester-urethane foams.

Both the TDI isomer system and the amount of water have a slight effect on resistance of the foams to compression set at 70°C. over a 22-hour period. The data in Table II, of course, are relative, since typical polyester-urethane compression set values for this test range from 5 to 15 percent. The high values result from the inclusion of some experimental polyesters, which behaved poorly in the design. Paraplex U-148 gives an average (including the better and poorer TDI formulations) of 15 percent compression set.

The recent interest in the aging characteristics of polyester-urethane foam at elevated temperatures and humidities encouraged some investigation into the effects of the three variables of formulation upon aging of the foams considered in this article. Specimens such as are used to determine compression modulus were tested for initial strength at 25 percent deflection on the Instron machine. The specimens were aged for two weeks at 140° F. over water in a dessicator and, after conditioning for three days at approximately 75° F. and 40 percent relative humidity, were retested. Percent loss of strength was determined by dividing the loss at 25 percent deflection by the initial value (Table III).

The variation in the TDI isomer system (between 65:35 and 80:20, 2,4:2,6) does not influence the relative loss in load bearing values. On the other hand, both the concentration of TDI (TDI to polyester ratio) and water (residual TDI to water ratio) affect the relative sensitivity of the foams to the arbitrary aging conditions used. The systems having a lower ratio of TDI to polyester (3.0) and lower ratio of residual TDI to water are more susceptible to loss in load bearing strength.

The practical significance of the data is questionable for at least two reasons: (1) the combination of aging conditions (time, temperature, and humidity) is arbitrary, with no basis for interpretation as an accelerated aging or practical service test; and (2) the relative loss in load-bearing strength by this test has not been compared to the loss possible in other physical or mechan-

(Continued on Page 248)

TABLE II—EFFECT OF VARIABLES OF FORMULATION ON PERCENT COMPRESSION SET

(ASTM Method B)

	TDI Isomer System		Ratio of TDI to Polyester		Ratio of Residual TDI to Water	
	80:20 2,4:2,6	65:35 2,4:2,6	3.0	3.5	1.0	0.75
% Set	46	42	44	44	42	46

TABLE III—HIGH TEMPERATURE-HIGH HUMIDITY AGING TESTS

(Percent Loss in Compression Modulus)

	TDI Isomer System		Ratio of TDI to Polyester		Ratio of Residual TDI to Water	
	80:20 2,4:2,6	65:35 2,4:2,6	3.0	3.5	1.0	0.75
% Loss	14.6	14.9	17.6	11.9	12.7	16.8

Testing of Rubber at Low Temperatures

A Description of a New Sub-Arctic Testing Apparatus and Its Application to Five Separate and Distinct Valid Tests

By ROBERT BROWN

Development Engineer, Tenney Engineering, Inc., Union, N. J.

COUPLED with man's aggressive probing above the earth's surface, and his continued insistence upon seeking out whatever resources the polar regions may offer, is an ever increasing need for materials which will withstand the extreme colds found in these regions. Manufacturers in all phases of industry are being called upon to meet lower and still lower temperature specifications in the production of their products. First it was just a few degrees below zero, then to −40°F., now to about −85°F., soon below −100°F.

To aid in the development of rubber for low temperature applications, one large Eastern synthetic rubber manufacturer maintains a rubber laboratory which not only tests submitted samples at temperatures to —85°F. but also will conduct experiments to develop a rubber to meet given low temperature specifications. To conduct these low temperature tests at the ever-lower temperatures required, the laboratory recently installed a "Sub-Arctic" chamber (Figure 1) manufactured by Tenney Engineering, Inc. In this chamber, capable of reaching —95°F., are conducted the Bent Loop Test, Compression Set Freeze Test, Jolly Balance Stiffness Test, Cellular Rubber Compression-Deflection Test, and Young's Modulus Test.

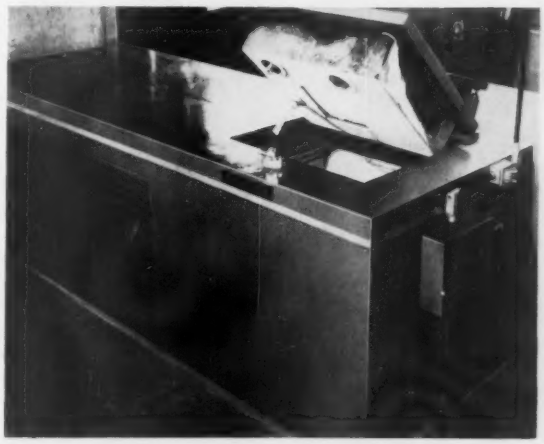

FIG. 1—Over-all view of the Tenney "Sub-Arctic" chamber designed for low temperature testing.

Bent Loop Test

The Bent Loop Test is a brittleness test. In carrying out this test, elastomer specimens 0.080-inch thick, and shaped as in Figure 2, are bent into horseshoe loops and secured between two parallel plates of a portable "flexing fixture". At the beginning of the test, these plates are 2½ inches apart. The fixture is placed in the cold box at the desired test temperature. Synthetic rubbers remain in the box for 5 hours, natural rubber for 96 hours. At the end of this time, and while still in the cold chamber, the plates of the flexible fixture are rapidly moved to within 1 inch of each other. Samples are then examined for fractures or cracks.

At least two specimens are tested at a time. If both show no cracks, the compound is considered to have passed the test. If both show cracks, the compound is considered to have failed. If one passes and one fails, the test is repeated with different specimens, and if one fails again the compound is considered to have failed. The test chamber was designed with handholes so tests could be conducted inside the box without opening the cover.

Compression Set Freeze Test

The Compression Set Freeze Test gives the loss of thickness of a specimen after being compressed for a

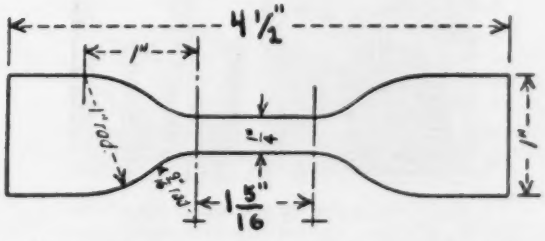

FIG. 2—Shape and dimensions of specimen used for the Bent Loop Test.

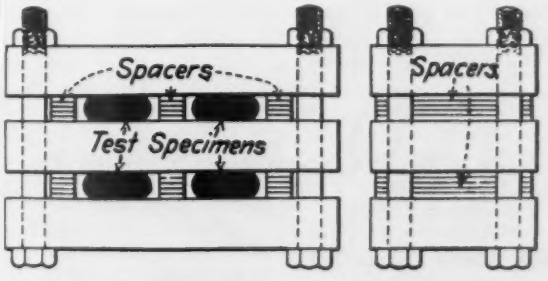

FIG. 3—Schematic of jigs used with cylindrical discs for the Compression Set Freeze Test.

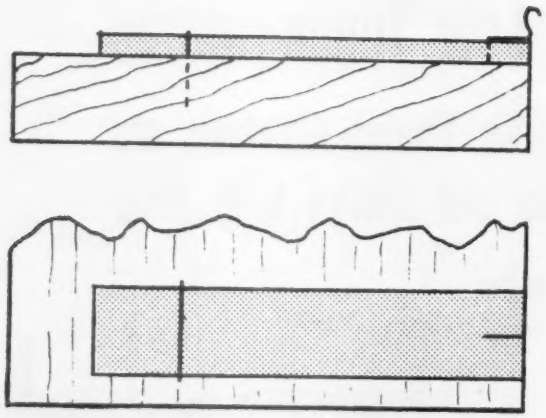

FIG. 4—Method of fashioning a small hook for the specimen used for the Jolly Balance Stiffness Test.

period of time at a given low temperature. This loss of thickness, or set, is temporary since the specimen will regain its original dimensions when brought back to room temperature or slightly above.

Under this test, cylindrical discs 1.129 inches in diameter by 0.5-inch thick are compressed in jigs similar to those in Figure 3. The amount of compression applied depends upon the hardness of the sample. The following table gives deflection specifications for samples of various hardness:

Durometer Hardness Number	Deflection Per cent of Original Thickness
30 ± 5	40
40 ± 5	40
50 ± 5	30
60 ± 5	30
70 ± 5	25
80 ± 5	25
90 ± 5	20

Spacers in Figure 3 correspond in thickness to the value to which the sample is to be compressed. Bolts are tightened until plates contact spacers.

Loaded jigs are placed in the low temperature cabinet which is set at the temperature at which the vulcanizates are being evaluated. In this test, the conditioning periods are 22 or 94 hours for synthetic and natural rubbers, respectively.

Specimen thickness is measured (inside the box) within 10 seconds after releasing from the jig and again 30 minutes after release. A thickness gage at test temperature is used for taking measurements. Pellets are placed in the gage with tongs because handling them by hand would warm the pellets and produce an erroneous reading. From the data gathered the compression set is calculated as a percentage of the original deflection. In this computation the formula

$$c = \frac{t_o - t_i}{t_o - t_s} \times 100$$

is used, t_o being original thickness, t_i the thickness at the 10 second or 30 minute reading, and t_s the thickness of the spacer used.

Jolly Balance Stiffness Test

The Jolly Balance Stiffness Test measures the force necessary to raise one end of an elastomer specimen a distance of 1 cm, the other end being fixed. Sample size for this test is ½-inch wide by 2 inches long.

A staple-hook is fashioned at one end of the sample by driving one point of a staple with a desk stapler into the center of the sample about ¼ inch from the end. Using a small pair of pliers, the overhang is fashioned into a small hook (see Figure 4). The test specimen is then stapled to a board 2 inches from the hook end. It is first tested for stiffness at room temperature and after mounting it remains at room temperature from 16 to 24 hours for conditioning.

A Jolly spring balance with a spring having an elongation of approximately 1 cm per gram is used in taking measurements for this test. The usual index, however, is replaced with one having lines spaced 1 cm apart.

In conducting the test, the length of the chain, index line and lower line on the glass tube are adjusted so they coincide at a convenient point on the scale when the end of the test specimen just starts to move away from the board. This reading is recorded and the Jolly balance adjusted until the index line coincides with the upper line on the glass tube. This reading is recorded and the difference between the two is the stiffness of the test specimen at room temperature.

The test specimen is then placed in the Tenney chamber for 1, 2, 4, 7, 14 or 21 days and the stiffness measured as at room temperature, except that the Jolly balance is placed over a port in the top of the chamber and the chain lengthened to engage the samples inside.

The increase in stiffness is the difference between the cold box reading and the room temperature reading.

Cellular Rubber Compression-Deflection Test

The Cellular Rubber Compression-Deflection Test is designed to compare deflection at —40°F. with that at room temperature.

A load in pounds sufficient to obtain 25% deflection of

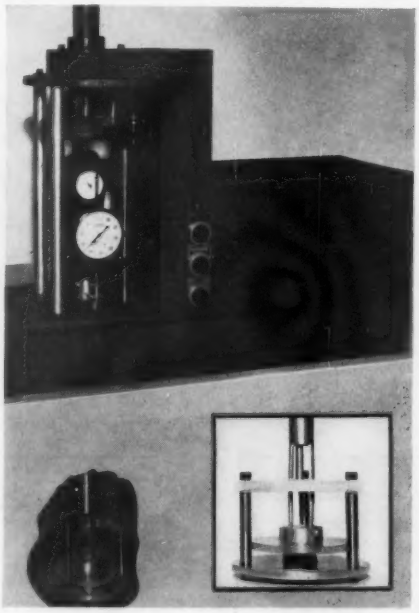

FIG. 5—Special apparatus designed for the Cellular Rubber Compression-Deflection Test. Insets indicate compression device.

a 1.129-inch diameter by 0.5-inch thick (approximate) specimen is first applied to the sample at room temperature of —40°F. At the end of this time the previously determined load is applied quickly while the specimen is still in the cold box and the deflection recorded immediately.

The percentage change in deflection, C, is calculated by use of the formula

$$C = \frac{D - E}{D} \times 100,$$

where D is the deflection at room temperature and E the deflection at —40°F.

To carry out this test, a special apparatus has been designed which permits the specimen to remain in the test chamber while the load is applied outside the chamber.

This equipment is shown in Figure 5. The sample is placed on a fixed platform suspended through a port in the top of the "Sub-Arctic" test chamber. At the end of 5 hours, a load is applied by operating a motor which drives a piston down upon the sample, compressing it (see inset). A force indicator and deflection gauge outside the chamber gives force and deflection readings.

Young's Modulus

Tests for determining Young's Modulus in flexure are designed to measure the low temperature effects of (1) Second Order Transition (Vitrification), which is relatively independent of time of exposure to low temperatures, and (2) Crystallization or other effects which are strongly dependent on time of exposure to low temperatures.

In these tests, provision is made to conduct tests inside the cold box and take readings outside. Samples ¼-inch thick by 1-inch wide by 2½ inches long are mounted on specimen supports as shown in Figure 6. Special apparatus (as shown in Figure 7) is used to enable up to 24 specimens to be tested at once. This apparatus is placed in the cold box and the drive shaft mated with a section which extends through the cover of the box. The box is equipped with an observation window which enables the laboratory technician to see to rotate successive samples under a deflecting rod which also is manipulated from outside the chamber. The deflecting or loading rod can be loaded from outside the chamber with weights which raise or lower the foot of the rod as it rests on samples in the chamber. The rod is counterbalanced (see Figure 7) with a dead weight. A dial micrometer gauge

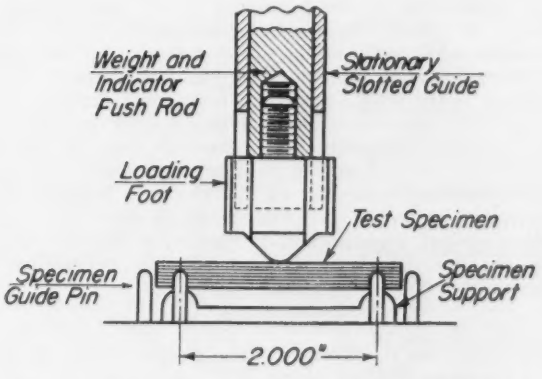

FIG. 6—Schematic of apparatus and specimen used for determining Young's Modulus.

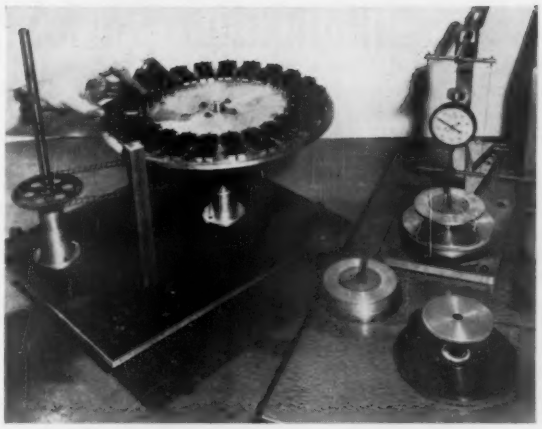

FIG. 7—This special Tenney device enables up to 24 specimens to be tested simultaneously for Young's Modulus.

calibrated to 0.001-inch measures the travel of the rod as it is raised or lowered by adding or removing weights.

In determining Young's Modulus, the loading foot is lowered to rest on the center of the specimen and the dial indicator reading noted. Next, the weight pan is loaded for 10 seconds with a weight sufficient to produce a deflection of 0.010 to 0.025 inch. The weights are removed and after 10 seconds the dial indicator reading is recorded as R_1. The load is then reapplied and after 15 seconds the dial reading is recorded as R_2. Young's modulus in pounds per square inch, E, can then be determined by the formula

$$E = \frac{L l^3}{4\, w t^3 (R_2 - R_1)}$$

in which L is the load in pounds in the weight pan, l is the distance between the sample supports in inches, w is the width of the specimen in inches, and t is the thickness in inches.

Young's Modulus is determined from data recorded at 70°, 32°, —40° and —70°F. (descending) and at ten degree increments from —70° to +70°F. (ascending) when crystallization or other time effects are negligible. The box is stabilized at the given temperature for 15 minutes before taking readings. The American Society for Testing Materials, in Test Method D-747-46, includes a monogram for determining Young's Modulus from this data.

For detection of crystallization or other time effects, R_1 and R_2 readings are taken after maintaining the box at —4°F. for natural rubber or +32°F. for Neoprene GN. These are approximately the temperatures for maximum rates of crystallization. The temperature (with specimen inside the chamber) is maintained at —4°F. or 32°F. for 72 hours and then dial indicator readings are taken at —70° to +70°F. in 10° increments.

Values of E obtained with and without the 72 hour conditioning period are plotted against temperature. If the calculated modulus after the 72 hour conditioning period is considerably larger than before the 72 hour exposure the presence of crystallization or other time effects is indicated.

These tests are enabling the company to supply manufacturers with vital information about the characteristics of elastomers under low temperature conditions. They take the guess work out of how these materials will react under extreme temperature conditions.

Rapid Analysis of Rubber Vulcanizates

THE National Bureau of Standards has developed a rapid, convenient method for determining natural rubber in vulcanizates of GR-S and natural rubber. Based on studies by the NBS staff, the procedure involves thermal decomposition of the vulcanizates and infrared spectroscopic analysis of the resulting products. This method will make it possible to perform quantitative analyses of polymeric materials that have defied analysis because of their insoluble nature or the presence of interfering fillers.

Until now, methods for quantitative estimation of natural rubber in vulcanized samples have been difficult and time consuming. The direct analytical method involves successive steps where the sample is extracted, dried, and digested by chromic acid. A distillate of acetic acid, formed during oxidation of the sample, is titrated and calculation of rubber hydrocarbon content is based on the yield of acetic acid.

The direct method, besides being involved, often gives erroneous results for mixtures of natural and synthetic rubber. The indirect method is even less satisfactory. Here, all the non-rubber hydrocarbon constituents are determined, and the rubber content calculated by difference. The limitations of this method, especially in determining the non-rubber constituents, make the results subject to large cumulative errors, and no differentiation between natural rubber and synthetic rubber is ever possible.

In the NBS method, the sample is milled and extracted with acetone, and the solvent removed by vacuum drying. A 0.5-gram specimen is pyrolyzed in a modified combustion furnace at 550°C. One or two drops of the liquid distillate are placed between two sodium chloride windows having a lead spacer 0.025 mm thick. Each liquid distillate obtained upon pyrolysis is analyzed with a recording spectrophotometer using sodium chloride optics. The concentration of natural rubber is determined by comparing the relative intensity of absorption bands at wavelengths characteristic of natural rubber and GR-S. These bands are 11.25 microns for natural rubber and 11.02 microns for GR-S. The pyrolysis of the sample and its infrared analysis require about fifteen minutes, compared to four hours or more for analysis by the usual direct or indirect methods.

In the course of his analysis, the operator uses a calibration curve relating the ratio of transmittances of GR-S and natural rubber to the concentration of natural rubber. The work has established that the log of this ratio is nearly a linear function with respect to the concentration of natural rubber, based on the total polymer weight.

This method should also be of value in more fundamental studies of polymer degradation and depolymerization. Here it could be used to obtain additional data on pyrolysis products unsuited to mass spectrometry.

Electrostatic Spray-Coating of Vinyl Plastisols

FIRST successful process claimed for electrostatically spray-coating vinyl plastisols on fabricated wire baskets, dish drainer racks, display racks and other wire goods on a production-line basis was announced jointly by the Scientific Electric Co., Garfield, N. J., designer and manufacturer of high frequency and high voltage equipment, and the United Chromium Division of Metal & Thermit Corporation, metal finishing specialists.

Electrostatic spraying of plastisol is said to be more than twice as fast as conventional dip-coating. It completely eliminates plastisol wastage due to "running", reduces the intermittent handling ordinarily required in dip-coating, and produces a superior coating in terms of uniformity and appearance to that obtained by dip methods. The entire operation is conveyorized; the actual spraying is automatic.

The process makes use of "ionic guns" with newly developed "atomic nozzles" and powered by a 140-K.V.P. ionic high potential power supply to spray an ionized "mist" of plastisol around the object to be coated. The "mist" is able to reach and deposit evenly over the entire surface—inside and out—of intricate wire goods. The equipment is an adaptation of Scientific Electric's standard line of ionic high potential spraying equipment. The plastisol was specially formulated by United Chromium for electrostatic spray coating.

Production rate depends upon the number of guns used on the line—the more guns the faster the work rate. Each power supply can handle up to 12 guns; an average installation would utilize four guns.

Polyester-Urethane Foams

(Continued from page 244)

ical aging tests. The one implication justified is that, should aging at combined high temperatures and humidities become of practical importance, the concentrations of TDI and water would require investigation if optimum performance under such conditions were desired.

Conclusion

Progress in the manufacture, use, and development of flexible polyester-urethane foams can be considerably aided by an understanding of the effect of variables of formulation on the properties of the foam. Hopefully, the limited information presented here will encourage additional studies of the relationship between formulation and property. Of great importance in such studies is the need for carefully designed experiments to indicate which variables influence specific properties. Frequently, a graphic presentation of data, in which property is plotted against designed formulation factors, facilitates understanding of the system. Whether involving a complete factorial, Latin Square, or some other variant, experimental designs are of definite value in the study and preparation of polyester-urethane foams.

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(2) Hochtlen, A., "Progress in the Chemistry and Processing of Polyurethanes," *Kunststoffe*, Vol. 42, pp. 303-10 (1952).

Modern Rubber Calendering Equipment

By the Late N. J. ELDER
Adamson United Company, Akron 4, Ohio

SINCE the end of the last war, several significant improvements in design have been made in calendering equipment for rubber and plastics. These changes apply to most types of calenders for producing rubber or plastics sheet, film, and coated fabrics. The most important improvements have been brought about by the requirements of the plastics film manufacturers, and the point has now been reached where this equipment of the new design is being installed in the rubber industries in some quantity. In this article descriptions are given of the improved features of major importance, such as crown compensation equipment for the rolls, circulating hot water temperature control systems, peripherally-drilled rolls, circulating oil lubrication systems, and "zero clearance" equipment for the main calender bearings.

General Observations

Since the turn of the century and before, nearly all operations in rubber plants involving rubber sheeting, skim coating, and friction coating have been carried out on simple 3-roll vertical units. Referring to Figure 1, it will be observed that this basic calender consists of three rolls mounted in sleeve bearings, driven by a bull gear and pinion from a standard commercial reduction unit. In such a calender, there is no method of compensating the rolls for bending during operation. In addition, there is considerable clearance in the main sleeve bearings which contributes to gage irregularities. Control of the roll temperatures is usually by means of hand-operated valves, which means that variations in surface temperature of 15 to 25 degrees are not at all uncommon.

In the hands of a skilled operator, it is possible for such a calender to do a reasonably good job of coating fabric with rubber within a tolerance of perhaps plus or minus .0005 inch, assuming the very best operating conditions. Under more difficult conditions, where changes in compound, speed and gage are frequently required, it is difficult to hold the gage within plus or minus one to two thousandths of specification.

Note: This article is based upon a presentation made by the author before the Rubber and Plastics Division, American Society of Mechanical Engineers, New York, N. Y., November 30, 1953.

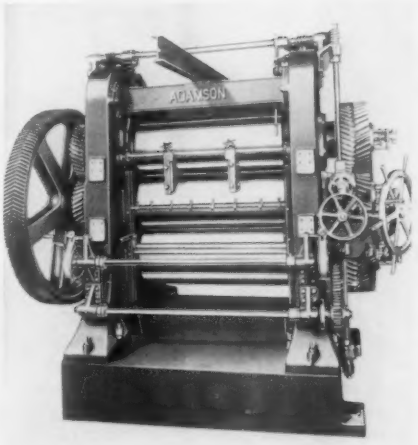

FIG. 1—Basic 3-roll calender.

In operating a 3-roll calender, a great variety of operating conditions are met and it is difficult to maintain sufficient accuracy on the older types of simple 3-roll calenders. One major difficulty stems from the use of the conventional chamber bored roll (Figure 2). The heat transfer rate obtained with chambered rolls is not entirely adequate, due primarily to the thick wall. It is impossible to change surface temperatures rapidly with this type of roll, and it is very difficult to control the surface temperatures accurately, particularly when the usual type of hand-operated controls are provided. If the operator decides that the temperature must be decreased by some 15°, he may have to wait an hour

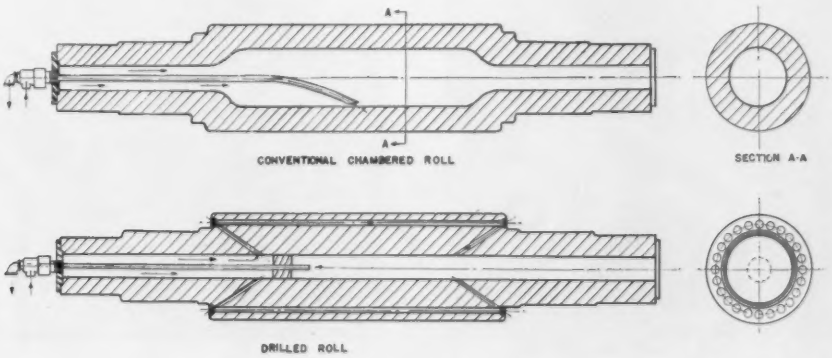

FIG. 2—Design of conventional chamber bored and peripherally-drilled rolls.

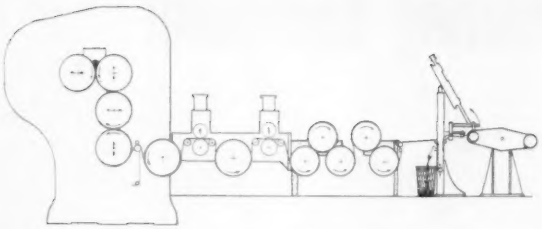

FIG. 3—Typical calender train for plastic film.

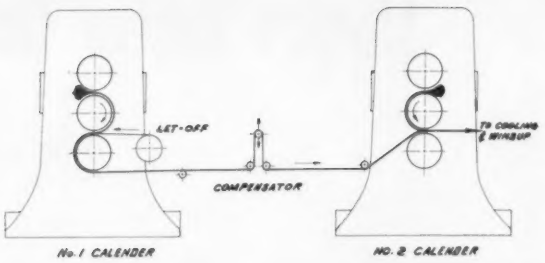

FIG. 5—Three-roll double-coat train.

or more for the calender rolls to reach equilibrium at the new temperature.

Due to the requirements of the plastics industry, then, it became necessary to design calendering equipment with improved temperature control, crown compensation equipment, better lubrication systems, and special equipment for stabilizing the rolls in the bearings. This precision calendering equipment, while beneficial and desirable for any calendering purpose, became an absolute necessity for plastics calenders, since they are called upon to handle such thin films. For example, most plastic film is in the range of .003 to .004 inch in thickness. In recent years a considerable quantity of two mil film has been produced. On such films the permissible tolerance is usually taken as plus or minus 5%, which imposes difficult standards on the calender equipment and accessories.

Since the plastic calender in many cases produces the final finished surface of the film, the rolls must be without blemishes or marks, and particular attention must be exercised in the foundry to eliminate the possibility of pin holes. The grinding operation must be carefully followed so that out-of-roundness and eccentricity will be minimized. It is common practice nowadays to produce 32-inch diameter and 36-inch diameter rolls weighing up to 33,000 pounds, having an indicated runout on the body of .0002-inch or less when running in their own journals in the grinder.

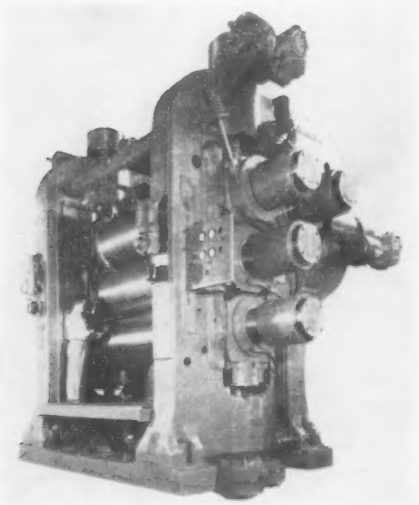

FIG. 4—32 x 92-inch 4-roll calender designed for a maximum speed of 150 YPM.

Typical Applications

A few explanatory remarks should be given at this time regarding typical uses to which these 3- and 4-roll calenders are put.

Typical Plastics Calender Train: Figure 3 shows a typical calender train for producing thin film and sheeting. Figure 4 illustrates a recent 32 x 92-inch unit with a designed maximum speed of 150 YPM. The inverted-L calender is shown, although the Zee-type calender is sometimes used for this type of work. The calender is followed by accessory equipment for removing the film from the calender, after which it is embossed and cooled, before being wound up in rolls. Two embossers are sometimes furnished, so that engraved rolls can be changed during operation.

Three-Roll Double-Coating Calender Train: Figure 5 shows the typical application of tandem 3-roll calenders for double-coating tire cord. In this application, the pick fabric is fed to the No. 1 calender from a roll, where it receives its first coat of rubber. After leaving the first calender, the fabric passes over a compensator (dancer) roll, which coordinates the speeds of the two calenders. The second coat is applied in the No. 2 calender, after which the material passes over cooling rolls and thence to the wind-up equipment.

Four-Roll Double-Coating Calender Train: The two methods of utilizing 4-roll rubber calenders for double-coating tire cord are shown in Figures 6 and 7. The inverted-L calender has been used for some years for this purpose, but is now being displaced by the Zee-type unit. A modern Zee is illustrated by Figures 8, 9 and 10. It would be possible to equip either the Ell or the Zee with substantially the same features which are now common to most of the precision type calenders which are built. For example, roll crossing equipment can be installed on either type of calender.

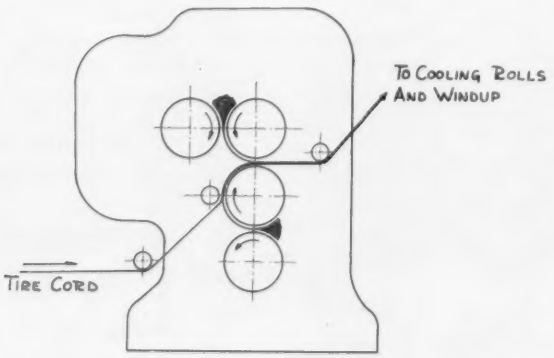

FIG. 6—One method for double-coating tire cord utilizes the inverted-L 4-roll calender.

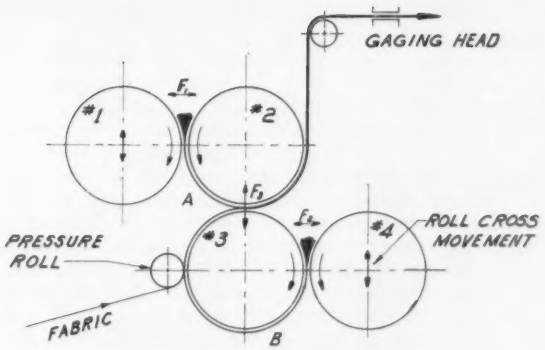

FIG. 7—Arrangement of rolls in a Z-type calender for double-coating tire fabric.

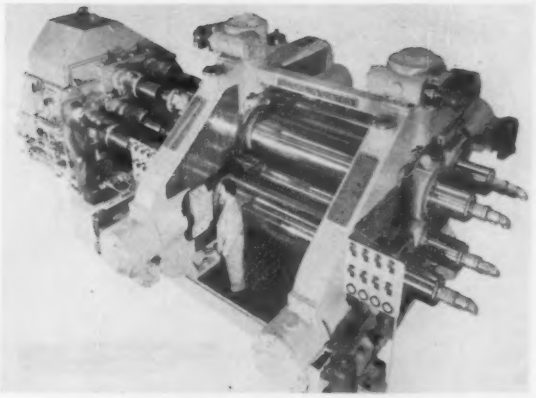

FIG. 9—28 x 78-inch 4-roll Z-type calender with separate pinion stand drive.

The major advantage of the Zee for double-coating tire cord is that the major separating forces in the No. 1/No. 2 pass and the No. 3/No. 4 pass (see Figure 7) cause the rolls to deflect in the horizontal plane. The horizontal deflections of the No. 2 and No. 3 rolls do not affect substantially the gage of the materials being laminated between the No. 2 and No. 3 rolls. This is especially important because the amount of deflection of the rolls changes considerably as operating conditions vary. For example, any change in operating speed, stock temperature, bank size, etc., will result in varying roll deflection. Referring to Figure 6, it will be seen that variable deflection of the No. 3 roll in the vertical plane will affect the final finished gage of the double-coated tire cord. This effect refers not only to the average gage of the sheet, but also to the thickness of the edges as contrasted with center.

An additional advantage of the Zee calender is that both side banks are horizontally disposed, which makes this calender considerably easier to feed than the inverted-L. This can be seen in the end view of the calender (Figure 10).

Use of Roll Crossing Equipment

Crossed axis or roll crossing equipment has been used for many years in this country on plastics calenders. As a matter of fact, Adamson supplied six calenders for one plant in 1946, all of which were equipped with roll crossing equipment. It is only in the past three or four years, however, that the device has come into use in the rubber industry. Crossed axis equipment will, it is believed, be installed on a large percentage of 4-roll and 3-roll rubber calenders built in the future.

The reason is that crown is a major problem for most calender operators. In double-coating tire cord or in handling frictioning or skim coating of fabric, the crown requirement on the calender rolls varies a great deal, depending on the operation being performed. Compounding, speed, gage, and temperature have a considerable effect on roll deflection. Unless some type of crown compensating device is available, a compromise crown must be ground on the roll and this crown will be satisfactory for only a few of the operations being performed. This means that for many operations a flat sheet cannot be produced, so that excess rubber must be applied to the fabric in order to make sure that minimum requirements are met. It is obvious, therefore, that without a means of compensating the crown, considerable material is wasted and quality standards are impaired.

Referring to Figure 7, which shows a Zee-type calender for double-coating tire fabric, present practice is

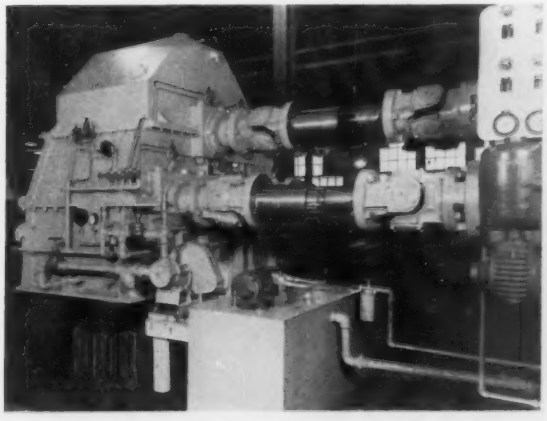

FIG. 8—Modern Z-type calender illustrating a typical pinion stand.

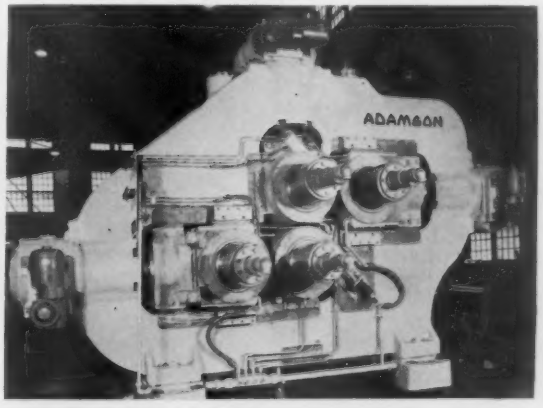

FIG. 10—End view of a 28 x 78-inch 4-roll Z-type calender.

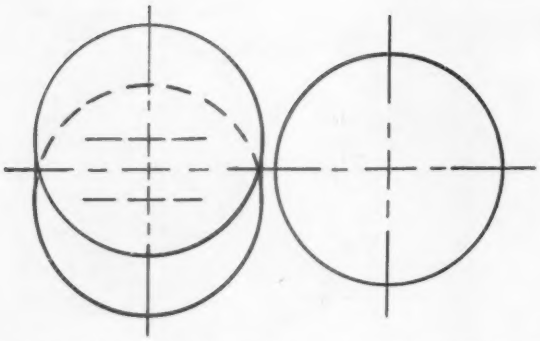

FIG. 11—Sketch indicating position of ends when rolls are crossed.

to cross the No. 1 and No. 4 rolls. These rolls are skewed in the vertical plane. On the No. 1 roll, for example, the near side roll box can be raised as much as one inch, while the roll box on the far side will be lowered by the same amount. This adjustment is made by a motorized device so that it can be accomplished by pushbuttons from the operator's control desk. Referring to Figure 11, it will be seen that, when the rolls are crossed, the ends are farther apart at the ends than in the center. Thus, by crossing the axis a crown has, in effect, been added.

Our present practice is to use selsyn transmitters and receivers, along with counters, which indicate in thousandths of an inch the exact vertical position of the roll boxes on the No. 1 and No. 4 rolls. This permits easy duplication of standard settings for subsequent runs. On the newer types of 3-roll calenders (Figures 12 and 13) a crown compensating device is installed on the top roll. On the conventional 3-roll vertical calender the top roll is crossed in the horizontal plane, which permits the operator to produce at all times a flat sheet in the area marked "A" in Figure 12. Also available is a new type of 3-roll calender, called the 120° unit, in which the top roll is crossed in the direction indicated in Figure 14. This arrangement is easier to feed than a vertical 3-roll, and variable deflection of the center roll affects the final pass to a lesser extent.

It should be emphasized that roll crossing equipment can be designed into nearly any type of new calender equipment. In other words, it can be applied to 3-roll vertical and angular calenders, 4-roll inverted-L units, and 4-roll Zee-type units. In addition, considerable thought has been given to the possibility of installing roll crossing equipment on existing calenders. Unfortunately, it develops that the costs are so great that it is perhaps more economical to purchase a complete new unit, than to attempt to modify an existing one. This is true because a separate pinion stand would be required for driving the calender and considerable machine work must be done on the calender housings and roll boxes. It is usually necessary also to replace the rolls, since it would probably be desirable at the same time to provide auxiliary pullback equipment which requires longer rolls.

Pinion Stands

Separate pinion stands for driving calenders are coming into increasing use. The reason is that more and more calenders are being built with crossed axis equipment. It has been learned through experience that the roll crossing design should provide for perhaps one inch or more of roll box movement, to allow adequate crown compensation. Under such conditions it is impossible satisfactorily to mount the gears on the roll necks, as was done on the older designs (see Figure 1). The best answer is to mount all the connecting gears in a separate gear stand so that each roll is driven separately by means of a universal coupling.

Once the need for roll crossing equipment has made a pinion stand necessary, a great many reasons can be advanced why the pinion stand is desirable. Enclosing the gears in a separate pinion stand is obviously a better design than mounting the gears on the calender roll necks. However, the pinion stand is considerably more expensive and for that reason it was not used to any extent until the advent of roll crossing equipment made it necessary.

Figure 8 illustrates a typical pinion stand, which encloses not only the connecting gears for providing the proper roll surface speeds, but also the double reduction bull gear and pinion stand. This permits the main drive motor to be coupled direct to the pinion stand input shaft. All the gears are single helical or double helical type, mounted in anti-friction bearings. The

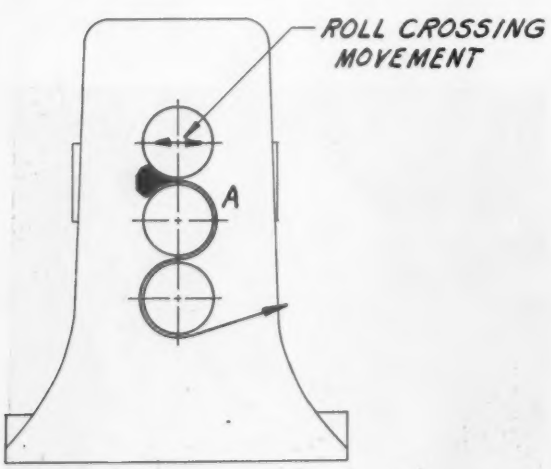

FIG. 12—Sketch of the vertical 3-roll sheeting calender with roll crossing equipment mounted on the top roll.

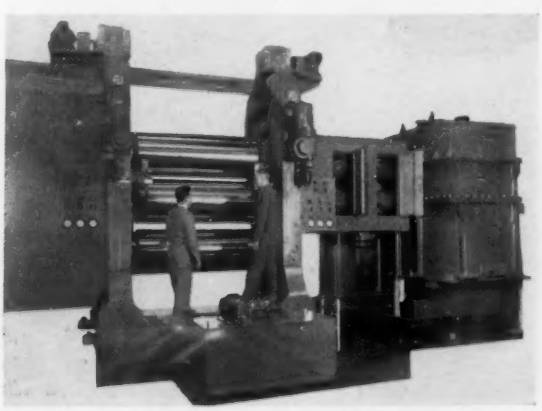

FIG. 13—View of a 24 x 68-inch 3-roll calender with crossed-axis device.

gears are mounted on fixed centers, which permits the use of finer pitch teeth than could be used if the gears were mounted on the calender rolls. Calender-mounted gears must have large-pitch teeth, in order to allow for roll adjustment and regrinding of rolls. When the gears are mounted in a pinion stand no allowance has to be made for these factors.

The pinion stand is equipped with its own separate lubrication system, with sight-feed control of oil-flow to the roller bearings. In addition, pressure jets are provided for controlling the flow of oil to each gear mesh. This is a closed system, with filtering and oil-cooling equipment, and foreign matter is effectively prevented from contaminating the oil.

Rolls are driven from the gear stand by universal couplings or spindles, which allow for the misalinement that occurs when rolls are adjusted or crossed. Spindles may be of the bronze slipper type, such as were used on the older precision calenders, or of the improved roller bearing type used on more recent designs. The newer type spindles are shown in Figure 15.

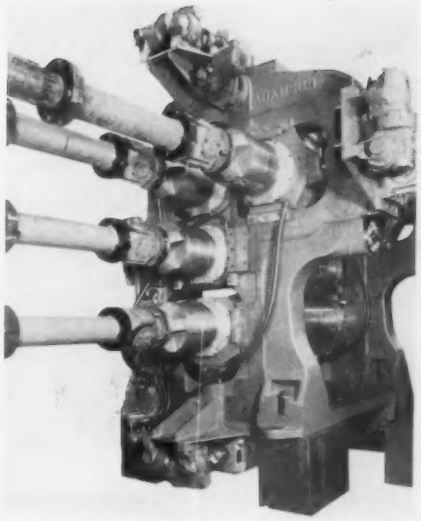

FIG. 15—This 24 x 68-inch calender uses spindles of the roller bearing type.

Peripherally-Drilled Rolls

Peripherally-drilled rolls have come into general use in the plastics industry and they are now displacing the chambered, internally-bored roll on most new rubber calenders. At the same time, a significant number of drilled rolls have been installed as replacements in existing 3-roll and 4-roll rubber calendering equipment.

Referring to Figure 2, it will be seen that the peripherally-drilled roll incorporates a series of passages, drilled immediately beneath the hard surface of the chilled iron roll. The distance between the outer surface of the roll and the center of the drilled hole may be only 2½-inches with a drilled hole diameter of 1¼-inch, which means that there will be only about 2 inches of metal over the drilled holes. On a chambered roll of comparable size the wall thickness might be 5 or 5½ inches. Obviously, much better heat transfer might be expected when the drilled roll is used due to the arrangement of the drills and to the larger area of metal in contact with the water.

In addition to improved heat transfer, the drilled roll is superior insofar as uniformity of surface temperature is concerned. This means that the drilled roll is what might be termed a "constant crown" roll, since it does not normally suffer from the extreme temperature variations which are normally encountered with the chambered roll.

The drilled passages can be arranged in various combinations of series and parallel flow. Many of the rolls have been designed as "single shot" units, with all the longitudinal passages in parallel insofar as water circulation is concerned. Most recent practice is to put each group of three or five holes in series, which increases the water velocity and promotes heat transfer. In addition, the series-parallel arrangement reduces the number of angular connecting drills at the ends of the rolls. Since these angular drills also affect the heating or cooling of the roll, there is some advantage to be gained by reducing their number.

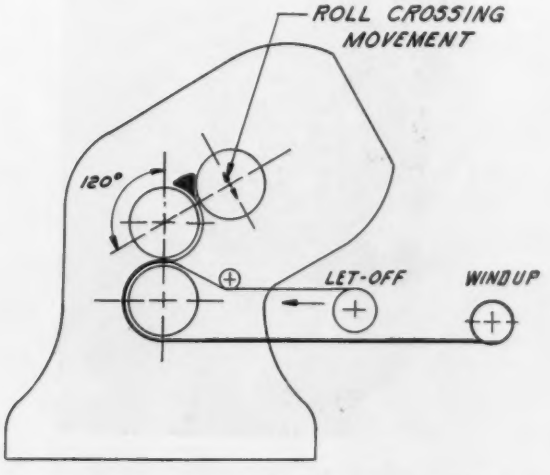

FIG. 14—Diagram of 120° 3-roll coating calender.

Temperature Control Systems

The newer installations of rubber and plastics calenders in this country nearly always incorporate peripherally-drilled rolls in combination with an automatic temperature control system. The temperature control system is usually of the circulating hot water type. These systems are closed units, operating under pressures of 175 to 200 psi, which prevents the water from flashing into steam, even though temperatures of 350° F. or higher are sometimes used. One or more pumps are used in the system to obtain a water flow through each roll of perhaps 100 to 200 GPM.

Normal practice is to control the outlet water temperature from each roll, since there has been as yet no satisfactory method of continuously reading roll surface temperature. Since the outlet water temperature is controlled, variations in operating conditions (such as calender speed, formulation width, etc.) will affect the roll surface temperature. Ideally, the circulating system should be controlled from the surface of the rolls, but no completely adequate pick-up system is as yet available.

During the warm-up period it is necessary to supply considerable heat in order to bring the surface temperature of the rolls up to 175 to 250° F. After the calender is placed in operation, the circulating system must re-

FIG. 16—Cone worm and wheel for operating adjusting screw on a modern 4-roll calender.

move a considerable amount of heat from the rolls. This heat, of course, is imparted to the rolls by the frictional work done on the rubber stock by the calender itself.

The greater the speed of the calender, the greater will be the amount of frictional heat which must be removed from the rolls. This will mean that the temperature of the water circulating through the rolls must be somewhat lower at high speeds than that at low speeds in order to increase the rate of heat transfer.

A great deal of development work has been done by the manufacturers of temperature control equipment in the past several years, with the result that the units have been simplified and cost has been reduced. Today's equipment is quite reliable and does not require excessive maintenance, even though the operating conditions for pumping equipment are somewhat difficult.

The circulating water temperature control system, when used in combination with peripherally-drilled rolls, practically eliminates the temperature control problem and frees the operator to concentrate on other phases of the production problem.

Additional Improvements

Pullback Equipment: Assuming the calender being discussed is a sleeve bearing unit, rather than roller bearing type, each of the main bearings will be equipped with pull-back or "zero clearance" devices. These zero clearance units are relatively narrow auxiliary bearings mounted outside the main bearings, used for removing clearance from the main bearing and also for removing clearance from the adjusting screw mechanism. Enough force is exerted against the zero clearance bearings by means of heavy springs or hydraulic pistons to maintain the rolls in their normally loaded positions. For example, on the Zee-type calender (Figure 7) the zero clearance device holds the No. 2 roll in the upper portion of its sleeve bearing and also acts to hold the entire structure up tight against the adjusting screws.

Circulating Oil Lubrication System: All precision calenders, whether for rubber or plastics, are equipped with a complete circulating oil system, including motor-driven pump, tank, filter, cooler, heat exchanger, alarm system and other necessary components. Main bearing boxes and seals are of advanced design, incorporating metal labyrinth type seals which eliminate the leakage problems encountered with the older composition seals. With this system, metered amounts of temperature-conditioned oil are fed to the bearings, and thermometers are provided for reading the temperature of the oil returning from each bearing box.

Precision Screwdown Equipment: The newer calenders are equipped with the Cone-Drive worm gear sets, similar to the one shown in Figures 16 and 17. These precision gears are of the type manufactured by Michigan Tool, a double enveloping type, which feature high load carrying capacity in minimum space. The worm and the gear are mounted on anti-friction bearings, on fixed centers. The adjusting screw moves in and out of the worm gear on a spline arrangement. This design permits the adjusting screw gearing to operate under ideal conditions on fixed centers, under clean conditions, with satisfactory lubrication. The arrangement contrasts with the older types of calenders, where the ordinary helical gear and cylindrical worm were of open-type design.

Automatic Stock Feeding Devices: One vital factor in gage uniformity is the uniformity of the stock feed to the two major calender banks. On the newer installations it is common practice to install strip feeding equipment to bring the warmed stock from the sheeting mill to the calender. These units can provide either a wig-wag head, or a single or double stationary strip, so located as to feed the roll bank as uniformly as possible. The objective is to keep the bank small and evenly agitated in order to avoid changes in separating force as the material is calendered. Changes in the size of the bank and temperature differentials in the stock bank will cause variable deflection of the calender rolls, which, in turn, affect the finished gage of the double-coated tire cord.

Gaging Equipment: The new types of beta ray gaging equipment reveal the greater rubber coating or calendering gage variation obtained when the older type calenders are used. With these new gaging devices, the effects of temperature variation of the roll surfaces, roll eccentricity, bearing clearance, feed variations of all

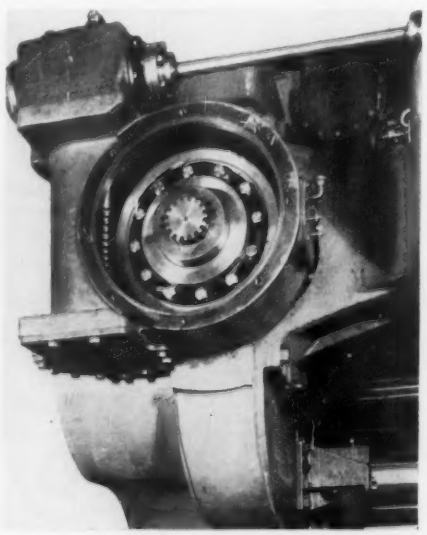

FIG. 17—Cone worm screw-down off-set roll on a 24 x 68-inch 4-roll calender.

sorts, and compound changes can be clearly observed. If the calender is stopped for a short time (which should be avoided, of course), when the operation is resumed, the beta ray gage will indicate that the rolls have gone out of round because of temperature differentials, and this eccentricity may persist at times for an hour or more.

In addition to devices for measuring the final gage of the calendered product, development work has been done on units of the back-scattering type for use with 4-roll double-coating calenders. These gages are intended for use in reading the thickness of the two rubber sheets before they are laminated to the tire fabric. A third gage of the conventional type reads the total thickness of the double-coated tire cord.

Some work has been done on automatic control of the calender screwdown equipment by use of beta ray devices. At the present time, however, this work must be regarded as being in the developmental stage.

Roller Bearings: Adamson has built a considerable number of large calenders equipped with roller bearings. Several of these units have been operating for six years on plastic film, at roll temperatures as high as 350° F. The roller bearing construction, while considerably more expensive than conventional sleeve-type bearings, provides certain advantages (Figure 18).

When the roller bearings are used, no wear of the calender roll neck is encountered, so that the accuracy originally ground in the tapered journal is maintained. This is not the case with the sleeve-type bearing, where the roll journal is subject to wear which results in eccentricity, which affects the gage of the material being processed.

Sufficient data is not as yet available on the life expectancy of roller bearing designs to determine whether roller bearings are economically justified. As additional production hours are accumulated on the bearings already in service, a true evaluation of the economics of roller bearing design versus sleeve bearing construction can be obtained.

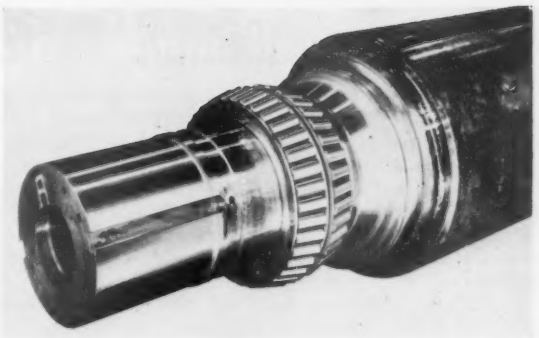

FIG. 18—Roller bearing on a 28 x 70-inch plastic film calender roll.

Conclusion

The modern precision calender, equipped with the various features described above, permits calendering operations to be performed with a much greater degree of accuracy than has heretofore been possible. With the new types of gaging equipment available, it is possible for the operator to exercise better control over the calender. Significant economies can be effected, because it is possible to produce material with a flat contour and it is possible to maintain constant gage. If the tire designer, for example, can depend on precision calendering operations, he can reduce specifications.

In each contemplated installation, a study must be made of the various operations which must be handled in order to analyze the potential savings in each individual case. In most instances it can be shown that economies can be effected through the use of a precision calender which will pay for the new calender within a relatively short period.

Flexible Vinyl Film Opens New Vistas in Photography

DEEP photographic images can now be developed with a durable, flexible vinyl film that is opening new vistas in photography. This picture-forming plastic consists of an organosol paste based on Bakelite vinyl resins containing light-sensitive, dye-forming and catalytic chemicals. The U. S. Army Signal Corps sponsored the development of this photosensitive plastic film for military field applications that include quick photo print production and map duplication. The military was particularly interested in the film, because it develops latent images by heating and does not require wet developers, thus eliminating the need for bulky equipment. Commercial application possibilities run the gamut from license plates to decorated floor and wall finishes.

Known as "Calimar," this flexible film was developed by the Ferro Chemical Corporation, Bedford, Ohio. The organosol paste in which picture-forming chemicals are mixed is formed by dispersing vinyl resins in plasticizer, diluent and filler. The film is exposed through a photographic negative to ultraviolet light and developed by heating. It bears a continuous tone photographic image extending clear through from top to bottom surfaces.

The depth of the image combined with the resistance of film based on Bakelite vinyl resin to wear, moisture and chemicals results in a photographic reproduction with unusual durability. These characteristics make Calimar film suitable for the production of identification cards, decorative film, blueprints and line drawings. This film is distinguished from conventional photographic materials because it is not coated with silver halides. Its speed of action is comparable to that of lithographic plates. In contact with a standard negative, the plastic film is exposed to ultraviolet light for about one minute. The light frees radicals from chlorinated paraffin, and the radicals activate metal oxides and dye formers in the film. A heating process causes light-activated compounds to form dyes, and simultaneously any dye formers not yet catalyzed by the light remain inert. A photographic image is formed through the entire thickness of the film, which is readily pulled off.

At the present time, Calimar film images are sepia-toned. Methods of obtaining true blue-black and possibly colored images are being studied. The film itself may vary from translucent to opaque with or without tinting colors, and it may have a wide range of flexibility. This photosensitive film has been primarily cast from Bakelite vinyl resin-base organosols, but future possibilities include solution types for compounding picture-forming lacquers and paints.

Handling Chemically-Coated Rubber Sheets

THE problem of finding the right containers to handle rubber bottle tops, stoppers and nipples coated with erosive processing chemicals was solved at Plasticoid Company, Inc., Elkton, Md., when the company purchased vulcanized fiber receptacles. They chose tough, durable Kennett receptacles, manufactured by the National Vulcanized Fibre Co., Wilmington, Del., after unsatisfactory experiments with several other types of containers.

Here's the materials handling problem they were trying to solve: Plasticoid Company, Inc., manufactures soft rubber goods, principally the tops used to close medicine vials containing ethical drug products such as penicillin or streptomyacin. These stoppers are stamped from large rubber sheets in two stages — a punch press operation followed by a hand punch operation.

The process begins in the Press Department where the natural rubber is molded to the shape of the stoppers. Then the sheets are coated with a mixture of glycerin and alcohol to keep them soft and pliable for later working and moved to the hand punch department. Here, employees with hand dies complete the processing by manually punching out the bottle tops.

The company's problem was to find a durable, chemically-resistant container to hold the chemically-treated, tacky sheets. Corrugated shipping cartons were uneconomical in service, since the chemicals rendered them useless after a very short period of time. Other containers were heavy to handle and also lacked durability. Metal boxes were discarded because they marked off.

The problem was successfully solved when Plasticoid tried Kennett receptacles fabricated from durable, chemically-resistant hard vulcanized fiber. These containers proved so satisfactory on the application that all the original group purchased in 1946 are still in service nine years later.

These receptacles were successful where other containers failed because of their unique combination of properties. Chemically inert, the vulcanized fiber is resistant to the action of the processing solution. After years of service the only indication of chemical action on the containers is a slight amount of warpage. The receptacles are tough and resilient and resist denting and cracking. They will not splinter, rust or corrode. They take abusive day-in, day-out service without damage.

Employees stamping out bottle stoppers from preformed rubber sheets with hand dies. The vulcanized fiber containers seen are immune to the chemicals with which the sheets are treated.

Being made from a material that weighs only half as much as aluminum and one-third as much as steel, these containers are extremely light in weight and easy to handle. As a result, the weight is in the load, not in the container. Plasticoid Company, Inc., also uses these Kennett receptacles for the storage of completed products.

The sturdy Kennett receptacles are also used for storage of completed bottle stoppers after stamping.

Coming Next Month...

"The Effect on Stress-Strain of Conditioning Unvulcanized Slabs" by B. G. Labbe, Government Laboratories, University of Akron, Akron, Ohio.

A study of the aging of unvulcanized stock during the period between remilling and vulcanization. Relative humidity and cure time are interrelated with the aging period in its resultant effect on the vulcanizate.

"Rubber and Plastic Packings"—by Frederick C. Thorn, Garlock Packing Co., Palmyra, N. Y.

A resume of mechanical packings which employ rubber or plastics as major constituents. The author indicates those properties which make rubber and plastics suitable for specific applications.

"How Duracraft Manufactures Rubber Duck Decoys" —By Beth Walker.

A descriptive article on the manner in which rubber duck and goose decoys are manufactured.

Also several other interesting articles.

The Nature of Stark Rubber

THE physical properties of polymers and their ultimate end uses as rubber, plastics, or fibers depend to a marked extent on the presence or absence of crystallinity and on the melting temperature. Many plastics and fibers would be rubbers if they were not crystalline at ordinary temperatures; actually these materials do become rubberlike above their melting temperatures. On the other hand, many rubbers owe their strength to the development of crystallinity on stretching. Yet rubbers that develop appreciable crystallinity on cooling tend to lose their elasticity and extensibility at low temperatures and are thus unsuited to use at very high altitudes or in arctic regions.

To obtain information which may serve as a guide in the preparation of new types of polymers, the National Bureau of Standards is conducting a program of basic research on the crystallization properties of polymers and their correlation with molecular structure. A recently completed phase of the program has dealt with the nature of stark rubber *(1)*. This work was carried out by D. E. Roberts and Leo Mandelkern of the NBS rubber laboratory and was partially supported by the Office of Naval Research.

The term "stark" is applied to those occasional specimens of natural rubber which are found to be hard and inelastic after prolonged storage in temperate climates. The hardness and inextensibility are due to the development of appreciable crystallinity during storage. Perhaps the most unusual property of stark rubber is its melting behavior. The melting point of stark rubber has been reported to be considerably higher than that of ordinary natural rubber *(2)*. However, once melted, stark rubber thereafter melts at the lower temperature and otherwise behaves like ordinary natural rubber.

The anomalous melting behavior of stark rubber has long been an obstacle to more complete understanding of the thermodynamics of polymer crystallization. To find out how stark rubber is formed and the reasons for its high melting temperature, the Bureau investigated the melting behavior and X-ray diffraction patterns of four stark rubber samples from widely different sources.

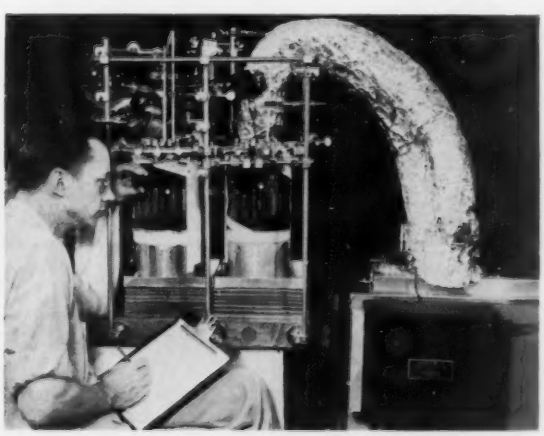

FIG. 1—Apparatus used to observe volume-temperature changes in stark rubber. The refrigeration unit at right is part of the temperature control system.

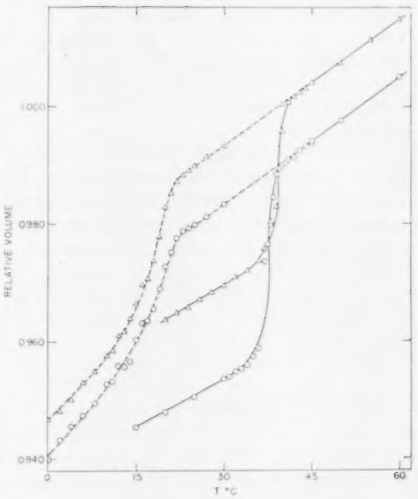

FIG. 2—Unusual melting behavior of stark rubber. Solid lines show the melting during the first heating; the dashed lines the melting when the same samples were first melted and then crystallized at 0°C.

In studying the melting behavior of the stark rubber samples the Bureau used volume dilatometers of conventional design (Figure 1) to observe the variation of the specific volume with temperature. These observations confirmed the higher melting temperature of stark rubber (Figure 2). The samples studied had melting temperatures in the range from 39° to 46°C., as compared to a melting point of 28°C. for natural rubber crystallized by cooling only.

The melting behavior of the stark rubber was also quite different in other ways from that of ordinary natural rubber and other polymers. In the temperature interval from about 35°C. to the melting temperature, the specific volume increased very slowly under isothermal conditions. Yet the total volume change at a given temperature was appreciable. This made it necessary to raise the temperature of the samples very gradually. Thus, the total heating process for a typical determination of the melting temperature required from 50 to 100 days.

X-ray diffraction patterns obtained from the stark rubber samples at room temperature (Figure 3) gave a rather clear indication of the basis for the observed crystallization behavior. Though the diffraction haloes corresponded to the spacings observed in natural rubber that has crystallized either by cooling or stretching, the intensities of the diffracted X-rays around the circumference of the rings were not uniform. This result indicates a preferred orientation of the crystallites as compared to the random orientation observed in systems where crystallization is induced solely by cooling. Because the crystallites are oriented, the amorphous regions that connect them must also be oriented to some extent.

In such an oriented system there are two possible explanations for the higher melting temperature. If the orientation is maintained on fusion, the melting temperature will be raised because less entropy is gained on melt-

ing relative to the unoriented system. Alternatively, at an appropriate temperature the oriented amorphous regions can rearrange themselves to their new probable configurations, and the crystallites will become unstable and melt. The latter behavior is a more likely possibility in the case of stark rubber, since normal crystallization behavior is observed after the initial melting.

The orientation in stark rubber is probably due to the original plantation processing. After coagulation of the latex, the amorphous rubber is rolled into sheets, and the sheets are stacked one upon another. The bale of rubber is then subjected for a time to a rather large simple compressional stress. It is likely that this stress can cause the amorphous segments to be preferentially oriented, and because of the high viscosity of natural rubber, this orientation can persist for long periods of time at the usual storage temperatures when the external stresses are removed. Orientation of the chain segments, in turn, facilitates crystallization at temperatures where crystallization is prohibitively slow for undeformed rubber.

In principle, other crystalline polymers could display this same melting behavior. In stark rubber the high viscosity of the amorphous material allows the orientation of the chain segments to be maintained for relatively long periods of time in the temperature range of interest. The lower limits of this temperature range are set by the equilibrium melting temperature of natural rubber. As long as the equilibrium melting temperature is sufficiently low, as in the case of natural rubber, for the rate of amorphous rearrangement to be slow, this phenomenon should be observed.

As a result of the Bureau's studies, it is possible to prepare stark rubber in the laboratory under controlled conditions. The essential requirement is orientation during the crystallization. Conditions should be provided such that crystallization occurs while the rubber is being deformed, and that when the external stresses causing the deformation are removed the orientation will persist at temperatures above the equilibrium melting temperature of natural rubber.

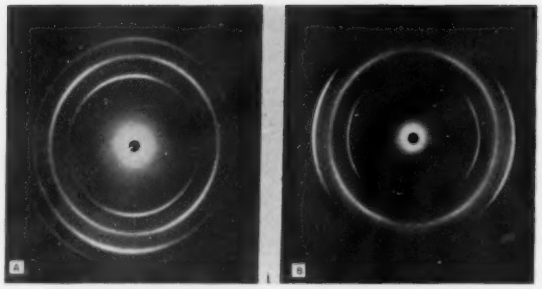

FIG. 3—Typical X-ray diffraction patterns obtained with a stark rubber specimen at room temperature. Preferred orientation of crystallites in stark rubber is indicated by the non-uniformity of some of the rings.

A—Naturally occurring sample. B—Sample prepared in the laboratory.

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(2) Roberts, Donald E., and Mandelkern, Leo, *J. Am. Chem. Soc.*, Vol. 77, p. 781 (1955).

Bisonides—A New Series of Polymeric Materials

A SERIES of new polymeric materials, produced by a unique process which utilizes vulcanized rubber scrap as the basic raw material, has recently been announced by the U. S. Rubber Reclaiming Co., Buffalo, N. Y. Called "Bisonides", they vary from a soft elastomer to a hard, tough thermoplastic material and are relatively low in cost. Although the starting hydrocarbon may be natural or GR-S type rubber, the Bisonides are polar and exhibit properties normally associated with other polar synthetic rubbers. They are curable by a unique mechanism which enhances their potentialities for new types of applications.

According to the company, the Bisonide polymers are oil resistant and possess excellent aging properties. They can be cured without the addition of sulfur, and are compatible with neoprene in all proportions. They have almost unlimited possibilities for modifying the properties of neoprene while retaining its oil resistance and good aging properties. Although by themselves they show considerable "nerve", they will reduce the mill roughness of neoprene stocks with which they are blended. They are also said to reduce the objectionable tackiness of neoprene compounds at high calender temperatures. They have a stiffening effect and increase the firmness of uncured compounds.

The Bisonides have an inherent high cured hardness, a very high curing rate, and a flat curing range. They show high vibration absorption or dampening. They can be extended with large quantities of oil and are supplied as oil-extended polymers when desired. The manufacturer claims they are compatible with low temperature plasticizers and, in consequence, are suitable for low temperature applications.

Among the applications suggested for the Bisonides are oil-resistant compounds, solvent-resistant compounds, gaskets, calender stock, mechanical goods, soles and heels, industrial oil-resistant matting, oil-extended stocks, sponge, structural hard rubber, C. V. wire, and all-purpose hydrocarbon extender.

TYPICAL PROPERTIES OF THE BISONIDES

	Bisonide No. 400	Bisonide No. 1600	Bisonide No. 1630*
Form Supplied	Slab or Powder	Slab or Powder	Slab
Plasticity (Mooney) ML/212/5-1	40–75	75–125	30–45
Specific Gravity	1.15	1.20	1.17
Rubber Hydrocarbon, %	48–50	45–50	37–40*
Acetone Extract, %....	20	25	35

* Oil-extended types are treated as if the rubber hydrocarbon were 50%.

Editorials . . .

Proposed Laboratory

THERE are several technical and commercial organizations devoted to new and increased uses of natural rubber. Many of these organizations, like the British Rubber Producers' Research Association, the French Rubber Institute and the Rubber-Stichting, are supported by cesses or taxes placed on each bale of rubber shipped from the various rubber-producing countries. The research activities of these organizations are a matter of public record, since they are made available through talks, special publications, regular reports, and the like.

Within recent weeks the United States has been favored by an extended visit from Mr. G. Martin who for many years was Superintendent for the London Advisory Committee for Rubber Research (Ceylon and Malaya) and is a Colwyn Gold Medalist of the Institution of the Rubber Industry. Mr. Martin, a recognized authority on natural rubber research, came to this country on behalf of the British Rubber Development Board and the British Rubber Producers' Research Association to study ways and means for the natural rubber industry to improve its technical service to the American consuming industry. Basically, he was anxious to learn in what form increased technical service might be established with the most direct and practical benefit to consumers.

In talks with various rubber technologists from coast to coast, Mr. Martin explored three specific avenues of approach. These included: (1) The possibility of establishing a rubber laboratory in this country to operate along technical service lines; (2) The possibility of conducting technical forums at various times in various rubber manufacturing centers, such as Akron, Boston, Trenton, Chicago, Detroit and Los Angeles; (3) The possibility of preparing a technical handbook. All of these moves would involve natural rubber exclusively—insofar as possible. This latter phrase is used because, in our opinion, the destinies of natural and synthetic rubber are intertwined for the foreseeable future.

The British Rubber Development Board, which is represented in the United States by the Natural Rubber Bureau, is to be applauded for its forward thinking. There is no question of the fact that in certain realms of activity there is keen, and will be keener, competition between natural and synthetic rubber. While cost is a primary consideration in the selection of any competitive raw material, any manufacturer worthy of his salt will carefully weigh all of the performance characteristics of any given material. If his evaluation can be aided and abetted by specific data relative to physical and chemical properties of given compounds, he should welcome such data. Most certainly the producers of synthetic rubber will shortly begin furnishing such information and there is no reason why similar data on natural rubber should not be made available.

We are not holding any brief for either natural or synthetic rubber in this instance, but are thinking in terms of the rubber manufacturer himself. Any progressive manufacturer welcomes technical information in any manner, shape or form, since comprehensive knowledge of available raw materials places him in a better competitive position, whether he produces tires or gaskets, belting or hot water bottles, adhesives or specification molded goods. Especially is he interested in reports on the compounding and processing of those products he is currently manufacturing. Any supplier of rubber chemicals will support this statement.

The American rubber manufacturing industry is a dynamic rather than a static industry and accordingly, we believe, would welcome the establishment of a natural rubber laboratory, whether it is an extension of the present laboratory operated by the Natural Rubber Bureau or an entirely new concept. We rather suspect that the personnel of such a laboratory would be hard put to keep up with the requests which would reach them on specific problems. It is doubtful that many of these would emanate from the larger rubber manufacturers, but there are hundreds of small and medium size firms which would jump at the opportunity to secure technical assistance.

We are emphasizing the phrase "technical assistance" because, in our opinion, no matter what the immediate objectives of a natural rubber laboratory would be the domestic rubber industry would sooner or later regard it as a source of information, one to which it could turn for answers to specific problems. The writer of this editorial is somewhat familiar with the type of requests received by and the type of service offered by the laboratories operated by the British Rubber Producers' Research Association and the Research Association of British Rubber Manufacturers in England, the French Rubber Institute in France, and the Rubber-Stichting in Holland.

It should be obvious from the above that we heartily welcome the idea of establishing a natural rubber laboratory in the United States. We think, too, the ideas of the forums and the handbook have considerable merit, especially the latter. There is a dearth of fundamental data on rubber compounding and processing, and we should like to see such topics covered in any handbook, whether it be devoted to natural or synthetic rubber.

Highlights Sidelights *of the News...*

November, 1955

Statistics furnished by the International Rubber Study Group as a result of its recent meeting in Liberia indicate that world new rubber use in 1955 will be in the order of 2,880,000 long tons . . . Of this total, the United States will account for 1,485,000 long tons . . . It is interesting to note that world natural consumption in 1955, estimated at 1,860,000 long tons, will exceed production by 10,000 long tons (page 261).

Record-breaking registration of 1,303 marked the 68th Meeting of the Division of Rubber Chemistry, A.C.S., at Philadelphia . . . In addition to the presentation of twenty-four technical papers, the meeting featured the presentation of the Charles Goodyear Lecture by Dr. R. P. Dinsmore . . . New officers for the 1955-56 season, as selected by letter-ballot, were also announced at the meeting (page 264).

The United States Supreme Court has agreed to review a lower court decision dismissing the government's six-year old anti-trust suit against E. I. du Pont de Nemours & Co., Inc. . . . The government contends that DuPont ownership of slightly more than 23% of General Motors Corp. common stock gives DuPont "working control" of the automobile company . . . The government wants the courts to order DuPont to sell the stock (page 278).

Among interesting papers presented before various rubber groups during the past few weeks were one by George Popp on "A New Era in Rubber" before the Chicago Rubber Group (page 274) . . . one by L. D. Carver before the Elastomer and Plastics Group on his recent trip to the Far East (page 273) . . . two papers on carbon black before the Boston Rubber Group, one by Carl W. Sweitzer on "Research Trends in Carbon Black", and the other by Lloyd D. Treleaven on "Some Functional Aspects of Carbon Black" (page 270).

A suit charging five officials and employees of the Thermoid Co. with manipulating the firm's books to avoid federal taxes has been dismissed by the New Jersey Superior Court . . . The court issued the dismissal order on the grounds that the plaintiff was unable to post a security to indemnify the defendants against costs and counsel fees (page 278).

Stockholders of the General Tire & Rubber Co. have approved the merger of Respro, Inc., Cranston, R. I., into the company's plastics operations. The merger had previously been approved by Respro stockholders (page 262).

NEWS REPORTS and Industry Activities

INTERNATIONAL RUBBER STUDY GROUP ESTIMATES 1955 NEW RUBBER USE AT 2,880,000 LONG TONS

THE International Rubber Study Group, which held its Twelfth Annual Meeting on October 17-21 in Monrovia, Liberia, has estimated that world consumption of new rubber in 1955 will total 2,880,000 long tons. This figure will include, the group states, 1,860,000 long tons of natural rubber and 1,020,000 long tons of synthetic rubber. The group estimated that world production of natural rubber in 1955 would total 1,850,000 long tons, while production of synthetic rubber would total 1,065,000 long tons. This makes for a total new rubber production of 2,915,000 long tons. The balance of estimated production of natural and synthetic rubber over estimated consumption, amounting to 35,000 long tons, will be available for absorption into stocks. The group was agreed that for future years substantial additional potential capacity for the production of rubber would be available to meet demand.

The meeting was attended by delegates from Australia, Belgium, British Colonial and Dependent Territories, Canada, Ceylon, Denmark, France, the Federal Republic of Germany, Indonesia, Italy, Japan, Liberia, The Netherlands, Thailand, the United Kingdom and the United States. In addition, an observer from the International Rubber Development Committee was present. The Honorable George Padmore, Under Secretary of State of Liberia, acted as chairman for the meeting. N. Kanokogi, head of the Japanese delegation, and W. B. L. Monson, head of the British Colonial and Dependent Territories delegation, served as vice-chairmen.

Modified Rubber Research

The group agreed that the work concerning rubbers for special uses, graft polymers and otherwise modified natural and synthetic rubbers, was one of the most promising lines of research and development from the standpoint of large-scale application. Therefore, it noted with satisfaction that work of this nature was being conducted at various research institutes. It was suggested that the volume of this work be expanded and the studies intensified.

The group emphasized again the importance of (1) continuing work on the development of planting material combining a high level of disease resistance with a high yield, and (2) continuing international cooperation in the exchange of improved planting material between the research centers and the rubber growing countries of the world.

The group was pleased to note that, in accordance with the recommendations made at its eleventh meeting in Colombo, a conference had been held in London on October 4-6 between representatives of the rubber manufacturing industry in the United States, the United Kingdom, France, the Federal Republic of Germany, Italy and The Netherlands, and the chief executives of the research institutes financed by producers.

The group noted the progress made at the Second International Rubber Quality and Packing Conference held in New York from May 3 to 6, 1955, and expressed the hope that the recommendations of this conference would be generally agreed upon and put speedily into effect, in particular those recommendations relating to the establishment of internationally agreed type samples.

The present position of technically classified rubber was considered, and the group recommended that the level of expected demand should be more precisely assessed by all concerned.

Management Committee Named

British Colonial and Dependent Territories, Ceylon, France, the Federal Republic of Germany, Indonesia, Japan, Liberia, The Netherlands, the United Kingdom, and the United States have been named as a Management Committee until the next meeting of the group which will be held in Bandung, Indonesia, in May, 1957.

Among the American delegates to the International Rubber Study Group meeting in Monrovia were Harvey S. Firestone, Jr., chairman, J. C. Roberts, director of rubber purchasing, and D. A. MacDougall, economist, all of the Firestone Tire & Rubber Co.; W. E. Klippert, vice-president of the Goodyear Rubber Plantation Co. and L. E. Spencer, assistant to the president of the Goodyear Tire & Rubber Co.; J. Ward Keener, vice-president, and W. W. Scull, director of manufacturing services, both of the B. F. Goodrich Co.

Also attending were Willis Armstrong of the U. S. State Department, official U. S. delegate; E. G. Holt, assistant director for rubber of the Business and Defense Services Administration, Department of Commerce, and George Casto of the Gen-

ESTIMATED NATURAL AND SYNTHETIC RUBBER CONSUMPTION IN 1955

(in 1,000 long tons)

Territory	*Natural*	*Synthetic**	*Total*
United States ..	620	865	1,485
United Kingdom.	245	19	264
France	126	25	151
Federal Republic of Germany ..	142	26	168
Japan	89	4	93
Canada	40	40	80
Italy	57	13	70
Australia	50	½	50½
Belgium	21	2	23
Netherlands	21	1½	22½
Denmark	7	½	7½
Other Countries.	442	23½	465½
Total	1,860	1,020	2,880

* Including oil-content of oil-extended rubbers, but excluding synthetic rubber produced in the U.S.S.R. and the Federal Republic of Germany.

SYNTHETIC RUBBER PRODUCTION

Estimated for 1955

(in 1,000 long tons)

Territory	*Amount*
United States	955(a)
Canada	100(a)
Germany	10
Total	1,065

(a) Including the oil content of oil-extended GR-S.

eral Services Administration. Ross Ormsby, president, and W. J. Sears, vice-president, represented the Rubber Manufacturers Association, and Fred Koyle attended as a representative of the Rubber Trade Association of New York.

According to the International Rubber Study Group forecasts, United States rubber consumption for 1955 is now estimated at 1,485,000 long tons, topping all preceding forecasts for the year by a healthy margin. The latest estimate for U. S. consumption includes 620,000 long tons of natural rubber and 865,000 long tons of synthetic rubber. The preceding record in the United States was the 1,338,000 long tons consumed in 1953. This broke down to show a consumption of 553,000 long tons of natural rubber and 775,000 long tons of synthetic rubber. Last year, a total of 1,233,000 long tons of rubber were consumed, including 597,000 long tons of natural and 636,000 long tons of synthetic.

The group's estimates show Indonesia again ahead as the world's largest natural rubber producer, accounting for 700,000 long tons of an estimated 1,850,000 long tons. Malaya is a close second with 630,000 long tons. More than a dozen other countries account for the remaining 520,000 long tons.

The United States stands alone as a major synthetic rubber producer, with an estimated total of 955,000 long tons. Canada comes next with 100,000 long tons and Western Germany with 10,000 long tons, for a record world output of 1,065,000 long tons. These figures, of course, exclude production in the Soviet orbit.

Consumption Exceeds Production

World consumption of natural rubber in 1955 set at 1,860,000 long tons exceeds production by 10,000 long tons. The production deficit, however, is said to have occurred in the first half of the year, and a surplus of about 42,500 long tons appears in store for the second half of 1955, according to preliminary group estimates.

The group estimate of synthetic rubber consumption of 1,020,000 long tons leaves a production surplus of 45,000 long tons for addition to world stocks. These figures may explain why world-wide rubber inventories have been on the rise in recent months, after declining throughout the first half of the year.

The contrast in the statistical position for natural rubber in the first and second half of 1955 emerges from the following preliminary estimate by the group:

World output of natural rubber in the first half of 1955 was 872,500 long tons, while consumption totaled 945,000 long tons —a deficit of 72,500 long tons. When this is balanced against the full year's predicted deficit of only 10,000 long tons, the second half shows a statistical surplus of 62,500 long tons.

The group agreed, however, that the first half consumption total of 945,000 long tons probably will be in for a downward adjustment—probably in the order of 20,000 long tons—when final figures are totaled. Such an adjustment, reducing the first half deficit to 52,500 long tons, will set the second half surplus at 42,500 long tons.

NATURAL RUBBER PRODUCTION
Estimated for 1955
(in 1,000 long tons)

Territory	*Amount*
Indonesia	700
Malaya	630
Thailand	120
Ceylon	92½
Viet-Nam	65
British Borneo	59
Liberia	37
Belgian Africa	26
British Africa	26
Cambodia	25
Burma	12
French Africa	3½
Papua	3½
Other Countries	50½
Total	1,850

Expanding Butadiene Facilities

Gardiner Symonds and Paul L. Davies, chairman and president, respectively, of the Petro-Tex Chemical Corp., Houston, Texas, have announced that the corporation has let a contract for the construction of new production facilities which will expand the output of its Houston butadiene plant by approximately 50%. The plant, acquired from the federal government last April, now has a capacity of 90,000 short tons of butadiene a year. Need for the expansion is indicated by growth in the synthetic rubber market, a company spokesman pointed out. The project was described as the first step in Petro-Tex Chemical's previously-announced plans for expansion in the petrochemical field. Work will begin immediately, and the facilities are expected to be completed and in operation by the end of 1956. The additional butadiene capacity will be obtained by using butane as a raw material, it was disclosed. In addition to the producing facilities, the company contemplates addition of process research laboratory and pilot plant facilities and an enlargement of plant offices as part of the expansion. Petro-Tex Chemical is jointly and equally owned by the Tennessee Gas Transmission Co. and the Food Machinery & Chemical Corp.

Approve Merger with Respro

Stockholders of General Tire and Rubber Co., Akron, Ohio, have approved the merger of Respro, Inc., Cranston, R. I. into the company's plastics operations. The merger had previously been approved by Respro stockholders. Under the merger agreement, one share of General Tire 5% cumulative preferred stock, of $100 par value, will be exchanged for six and a quarter shares of Respro capital stock. Respro, Inc., and its subsidiaries including United Lace and Braid Co., Lion Products Co., and United Chemicals, Inc., make vinyl sheeting, impregnated and coated fabrics, shoe materials, electrical tape and millinery braid. Respro had consolidated sales of more than $4,000,000 in 1954.

NATURAL RESEARCH LEADER COMPLETES INDUSTRY TOUR

George Martin, for many years superintendent for the London Advisory Committee for Rubber Research (Ceylon and Malaya) and Colwyn Gold Medalist of the Institution of the Rubber Industry, has just completed on behalf of the Natural Rubber Bureau and the rubber industry it represents, a visit to American rubber plants.

Mr. Martin, who met with rubber leaders in New York, Boston, Trenton, Akron, Buffalo, Chicago, Los Angeles, San Francisco, Denver and St. Louis, was here on an exploratory visit to determine the advisability of setting up in this country a technical liaison service that would work with manufacturers on problems having to do with the use of natural rubber.

He also described to American research executives a number of new technical advances that have been developed in the laboratories of the natural rubber industry. Mr. Martin discussed such recent developments as Heveaplus, graft polymers, cyclized rubber masterbatches, lignin masterbatches and similar materials. A good deal of interest was occasioned by samples of "Superior Processing Rubber" that Mr. Martin had with him. This is a new type of natural rubber that is more easily brought into the necessary smooth condition for preliminary shaping and subsequently retains its shape much better than any other type of rubber.

After spending six weeks on his cross-country fact-finding mission, Mr. Martin sailed October 25 on the Mauretania for England. There he will report the results of his talks in this country.

Purchases Circle Wire & Cable

The Cerro de Pasco Corp., 53 year old mining company with principal operations in Peru, has contracted to buy the Circle Wire and Cable Corp., Maspeth, L. I., for $20,250,000. Under the agreement adopted by the directors of both companies, Cerro de Pasco would take over the assets and certain liabilities of the wire firm with plans to liquidate Circle's 750,000 shares of $5 par common stock outstanding for cash. Officials of the mining company called the move a major step in the company's broad diversification program launched several years ago. Circle, which operates its main factory at Maspeth, makes more than 100 separate wire and cable products used for lighting, heating and power in industrial, institutional and residential construction. At Circle's other plant in Hicksville, L. I., three new buildings recently have been constructed to house an automatic copper rod mill and continuous steel flattening and galvanizing operations.

Bellanca-National Suit Dismissed

A recent suit filed against the Bellanca Aircraft Corp. of New Castle, Del., by National Electronics Laboratories, Inc., was dismissed on November 1 in Federal District Court in Washington, D.C. The suit had charged that Bellanca Aircraft had failed to go through with a contract to purchase National Electronics.

SIGNAL CORPS LABORATORIES PLAN 4th ANNUAL SYMPOSIUM

The Telecommunications Division of the Signal Corps Engineering Laboratories, Fort Monmouth, N. J., has announced plans for the Fourth Annual Symposium on "Technical Progress in Communication Wire and Cables". The symposium will be held on December 6, 7 and 8 at the Berkeley-Carteret Hotel in Asbury Park, N. J. Registration for the symposium will begin at 4:00 P. M. on December 5.

Technical sessions will be held in the morning and afternoon on December 6 and 7, and in the morning on December 8. In addition, a hospitality hour has been scheduled for 6:00 P.M. on December 6, and a special banquet will be held on Thursday evening, December 7. Major General James D. O'Connell, Chief Signal Officer, will be chief speaker at the banquet.

The welcoming address will be delivered by Colonel Earl F. Cook, Commanding Officer, Signal Corps Engineering Laboratories, Fort Monmouth, N. J.

The technical session on Tuesday morning, December 6, will be presided over by H. L. Kitts, Chief of the Outside Plant Branch, Signal Corps Engineering Laboratories. Papers scheduled for this session include:

"Ultra Accelerators in CV Vulcanization" by L. A. Brooks, J. L. Tronson, and A. C. Rowley (R. T. Vanderbilt).

"Physical, Mechanical, Chemical, and Electrical Properties of Marlex Ethylene Polymers" by Dr. R. V. Jones, P. J. Boek, and W. R. Clark (Phillips Chemical).

"Improved Polyvinyl Chloride Insulation for 105°C Service" by B. W. Hodges, J. L. Foster, and H. L. Wuerth (Goodrich Chemical).

M. Tenzer, Chief, Microwave Transmission Unit, Signal Corps Engineering Laboratories, will serve as chairman of the session on Tuesday afternoon, December 6. Papers scheduled for presentation at this session include:

"Obtaining Mobilization Preparedness for Signal Corps Wire and Cable" by A. G. Christiansen (Signal Corps Supply Agency).

"Progress in Air Dielectric Cables" by E. J. Merrill, A. L. McKean, and J. Arbuthnott, Jr., (Habirshaw Cable and Wire.)

"The Electrical and Mechanical Characteristics of the Helical Membrane Cable" by R. C. Mildner and R. J. Slaughter (Telegraph Construction & Maintenance Co. London).

"Military Applications of Silicone Rubber Insulated Wire and Cable" by J. F. Dexter (Dow Corning).

"RF Power Ratings of Teflon Coaxial Cables" by G. J. Mares and C. C. Camillo (American Phenolic).

"Recent Progress in Magnet Wire Enamels" by H. L. Saums and W. W. Pendleton (Anaconda Wire and Cable).

The morning session on Wednesday, December 7, will be presided over by W. R. Krueger, Chief, Line Facilities Section, Signal Corps Engineering Laboratories. The following papers have been scheduled for this session:

"Transmission Characteristics of Rural Distribution Wire at Audio and Carrier Frequencies" by J. A. Brazee (Whitney Blake).

"Rural Wire and Urban Wire for Telephone Distribution Systems" by A. P. Jahn (Bell Telephone Laboratories).

"Polyethylene Insulated Telephone Cable" by A. S. Windeler (Bell Telephone Laboratories).

"Protection Problems of Distribution Cable Systems" by J. W. Phelps (Bell Telephone Laboratories).

"A User's View of Plastic-Insulated Conductors in Outside Telephone Plant" by R. Foulkrod (Michigan Bell Telephone).

Panel Discussion—Engineers of Michigan Bell Telephone Co., R. Foulkrod Moderator; Panel—W. M. Alexander, Tools and Construction Equipment Engineer; L. M. Dahl, Materials and Construction Methods Engineer; J. R. Kershaw, Engineer of Plant Extension and Outside Plant.

The afternoon session on December 7 will be presided over by H. F. X. Kingsley, Chief, Field Wire and Cable Section, Signal Corps Engineering Laboratories. The following papers are to be presented at this session.

"Measurement of the Volume Resistivity of Plasticized Polyvinyl Chloride" by C. E. Balmer and R. F. Conyne (Rohm & Haas).

"The Spiral Multicolored PVC Jumper and Switchboard Wire" by Dr. G. de-Senarclens (Swiss Insulating Works, Ltd. Breitenbach, Switzerland).

"Crosstalk on Carrier Cables" by Dr. K. E. Latimer (Submarine Cables, Ltd. London).

"Recent Developments in Polyethylene Insulating Materials" by R. J. Lurie, and J. A. Snyder (Bakelite).

"New Use of Vinyl in Cable Construction" by M. W. Williams (Monsanto Chemical).

H. G. Gold, Chief, Special Cable Section, Signal Corps Engineering Laboratories, will serve as chairman of the final technical session on Thursday morning, December 8. The following papers have been scheduled for presentation at that session:

"General Properties of the New Super-Polyethylenes" by G. H. Sollenberger (Koppers).

"New Developments in Insulation Extrusion" by A. N. Gray (Western Electric).

"Developments in Submarine Communication Cables" by J. J. Gilbert (Simplex Wire & Cable).

"Development of Weather Resistant Vinyl Jackets" by E. E. Griesser and W. T. Higgins (Bakelite).

HARWICK STANDARD APPOINTS TWO NEW TECHNICAL SALES REPRESENTATIVES

R. VanPatton-Steiger

George R. Huhn

Harwick Standard Chemical Co., Akron, Ohio, has announced the appointment of two new technical sales representatives. Robert VanPatton-Steiger has been named technical sales representative in the New England area, while George R. Huhn has been named to a similar post in the Chicago, Ill., area. Mr. VanPatton-Steiger is a graduate of the Massachusetts Institute of Technology. Since 1936 he has been associated with various rubber companies both in development and production. "Van," as he is known in New England rubber circles, is a member of the American Chemical Society. His technical sales work will be largely in the New England area and he will operate out of the company's Boston, Mass., office.

Mr. Huhn was formerly associated with the B. F. Goodrich Co. in Akron, Ohio, as a compounder of sponge rubber and molded goods. Mr. Huhn was graduated from the University of Akron in 1952 with a B. S. degree in chemistry. He entered the technical training program at Goodrich, where his experience included evaluation and control testing of raw materials and compounding. Harwick-Standard states that Mr. Huhn will provide an important addition to the technical service in the mid-west area which is being served by its Chicago branch office.

RECORD ATTENDANCE FEATURES DIVISION MEETING AT PHILADELPHIA

The 68th Meeting of the Division of Rubber Chemistry of the American Chemical Society, which was held at the Bellevue-Stratford Hotel in Philadelphia, from November 2 to 4, turned out to be a record-breaking event. The official registration was 1,303, a new all-time high. The total ladies' registration was 67. In all, well over 1,400 members and guests were in attendance.

It was an exceptionally busy meeting, featuring the presentation of 24 technical papers, the Charles Goodyear Lecture, a specially-invited paper, a luncheon-meeting of the 25-year Club, the suppliers' annual cocktail party, election of new officers, a report from the new historian, the divisional banquet, and a most interesting program for the ladies.

New Officers for 1955-56

Election of new officers for the 1955-56 season, selected by letter ballot as usual, was announced by John Fielding (Armstrong Rubber), chairman of the Tellers Committee, at the business meeting, which was held on Thursday morning, November 3. For the record, a total of 1201 ballots were cast.

The new officers are: *Chairman,* Arthur E. Juve, B. F. Goodrich Research Center, Brecksville, Ohio; *Vice-Chairman,* B. S. Garvey, Jr., Sharples Chemicals Division, Pennsylvania Salt Mfg. Co., Wayne, Penna.; *Secretary,* Arthur M. Neal, Elastomers Division, E. I. du Pont de Nemours & Co., Inc., Wilmington, Delaware; *Treasurer,* George E. Popp, Phillips Chemical Co., Akron, Ohio. D. C. Maddy, of the Harwick Standard Chemical Co. at Los Angeles, Calif., was elected director-at-large.

Seven directors from sponsored local rubber groups were elected, each for two-year terms, as follows: *Connecticut,* C. A. Larson (Whitney Blake); *Detroit,* H. W. Hoerauf (U. S. Rubber); *Northern California,* J. M. Holloway (Mare Island Rubber Laboratory); *Philadelphia,* George J. Wyrough (Wyrough & Loser); *Rhode Island,* U. J. H. Malo (Crescent Co.); *Southern Ohio,* E. N. Cunningham (Precision Rubber Products); *Washington,* R. D. Stiehler (National Bureau of Standards).

B. S. Garvey, Jr.

The 24 technical papers, which were read at four separate sessions, were divided into four special groups, namely: (1) Methods of Quality Evaluation; (2) Compounding Techniques; (3) New Synthetic Rubbers; (4) General Papers. John M. Ball (Midwest Rubber Reclaiming), the retiring chairman, presided at the first session, John W. Snyder (Columbian Carbon), at the second, Arthur E. Juve (B. F. Goodrich Chemical Center) at the third, and B. S. Garvey, Jr. (Sharples Chemicals) at the fourth. The winner of the "Best Paper Award" will be announced shortly.

Of special interest were four papers on the new *cis*-isoprene synthetic rubbers, three prepared by members of the B. F. Goodrich Research Center and one by the technical staff of the Firestone Tire & Rubber Co. The three papers on the Goodrich rubber, called Ameripol SN, were presented by Dr. Frank K. Schoenfeld, vice-president in charge of research, while the one on the new Firestone rubber, called Coral Rubber, was given by Dr. Frederick W. Stavely, director of the company's chemical and physical research laboratories. Descriptions of both these rubbers have appeared in previous issues of RUBBER AGE.

Both speakers indicated that the new *cis*-isoprene rubbers have solved the problem of a general purpose synthetic rubber as a complete replacement for heavy-duty tires. According to Dr. Schoenfeld, the results of laboratory comparative evaluation tests indicate a virtual identity in the performance of Ameripol SN and Hevea rubber. The carcasses of tires run on test trucks in Texas were sound after 19,600 miles of operation and, though about 35% of tread pattern remained, they were recapped and placed in intracity bus operation.

Properties of Coral Rubber

According to Dr. Stavely, the physical properties of Coral Rubber approximate those of natural rubber in respect to high gum tensile strength, low heat build-up, retention of strength at elevated temperature and tread wear. It is actually better than the natural product in resistance to cracking in tire treads, to oxygen absorption and in thermal stability. He added that the development of the new synthetics was especially important in view of the fact that America's need for a military stockpile of rubber is currently costing about $20,000,000 a year to maintain.

Other papers at the meeting covered the effects of atomic radiation on rubber compounds, the development of permanent bright-colored rubber compositions, a new rubber synthesized from scrap, a report on the exposure of rubber to punishing atmospheric conditions in various parts of the country, the evaluation of important factors in road testing of tires, non-discoloring vulcanizing agents, and a grueling new test which supplies answers in one or two months as compared with one or two years of actual tire performance. Abstracts of all papers presented at the meeting appeared in our previous issue.

Dr. Ray P. Dinsmore, vice-president in charge of research and development of the Goodyear Tire & Rubber Co., winner of the 1955 Charles Goodyear Medal, the highest honor in American rubber chemistry, delivered his Goodyear Lecture during the morning session on Thursday, November 3. His topic was "Specifications of a Rubber Chemist."

Arthur E. Juve

Imaginary Lab Visit

In his lecture, Dr. Dinsmore took his listeners on an imaginery trip through a modern rubber laboratory, with "Dr. Elastomer" acting as host. He outlined the numerous facets of chemistry and technology with which the modern rubber chemist must have more than a nodding acquaintance, including those touching on physics and atomic energy, and compared the complexities facing such chemists with the relatively simple problems which faced the rubber chemist and compounder some twenty-five and forty years ago.

Numerous anecdotes were sprinkled throughout the lecture and the development of accelerators and antioxidants was traced. Dr. Dinsmore received a standing ovation at the conclusion of his lecture.

Also of special interest at the meeting was the presentation of an invited paper. This was entitled "The Technical Manpower Situation" and was presented by Dr. A. W. Davison, vice-chairman of the Engineering Manpower Commission of the Engineers Joint Council. Dr. Davison was

Arthur M. Neal

formerly director of research of the Owens-Corning Fiberglas Corp. and has had long experience in chemical engineering. He was introduced by Dr. Norman Shepard, a personal friend, who recently retired as chemical director of the American Cyanamid Co.

According to Dr. Davison, Soviet Russia is spending one-fifth of her entire budget on education, with emphasis on mathematics and science, in an all-out drive for technological supremacy. Accordingly, he declared, the United States, as a matter of self defense, must undertake to train enough scientists and engineers to retain its leadership in technology "which so far has protected it from attack." He coupled his talk with a plea for higher salaries to our teachers.

Citing estimates, the speaker indicated that Russia graduated only 28,000 engineers in 1950 to our 50,000, but in the current year it will graduate some 54,000 as compared with only 19,000 in the United States. Actually, Dr. Davison stated, there are two separate problems involved in the solution of this situation, one a short-term effort to persuade more of the men and women already in college to become scientists or engineers, and the other to provide more competent science teachers in the secondary schools. At present, he said, more than 5,000 science teaching jobs are filled by teachers untrained in science.

Active Business Session

The divisional business meeting was held on Thursday morning, November 3, with Mr. Ball presiding. The first order of business was a minute's silence in memory of five members who have died since the last meeting. These included: Carl K. Brobeil (Farrel-Birmingham), Gustav Egloff (Universal Oil Products), George S. Haslam (N. J. Zinc), Norman C. Hill (C. P. Hall), and C. H. Masland, II (C. H. Masland & Sons). An appropriate memorial was recited by the chairman.

Waldo Semon (Goodrich), chairman of the By-Laws Committee, then explained that the Executive Committee had approved several contemplated changes in the division by-laws. These included a change in Article 4 to provide for a Canadian representative on the Board of Directors, a change in Article 5 to permit alternate directors to serve at meetings of the board, and a change in Article 7 to permit the first two changes. All three of these changes were moved, seconded and approved. The Steering Committee will name an interim Canadian director until an election is held. A change in Article 10 to provide for the preparation of annual budgets rather than semi-annual budgets was also approved.

George E. Popp

John M. Ball (right) chairman of the Division of Rubber Chemistry, A.C.S., is shown here presenting the Charles Goodyear Medal to Dr. R. P. Dinsmore.

Dr. Semon also outlined the necessity for changing Article 12 to provide for both a Library Policy Committee and a Library Operating Committee. Under the change, the Policy Committee will consist of five members with five-year staggered terms while the Operating Committee will consist of a chairman and other qualified members. These changes were also put to a vote and approved.

It was announced at the business meeting that the Executive Committee had approved the appointment of an Associate Editor for *Rubber Chemistry and Technology*, to assist the present editor, Dr. C. C. Davis, and for the eventual transfer of publication activities to the Rubber Library at the University of Akron. The committee also approved the appointment of Dr. Howard I. Cramer (Sharples Chemicals) as councillor to succeed Dr. Semon who has served from 1952 to the present time.

A report from the Membership Committee, of which Mr. Hoerauf is chairman, indicated that 242 new members had been acquired since the last report, for a net gain of 78 new members. As of November 1, total division membership amounted to 3550 including regular and associate members and subscribers to *Rubber Chemistry and Technology*. Regular members totaled 2300.

It was also announced that the 1956 Spring Meeting would be held on May 16-18 in Cleveland, with C. A. Smith (N. J. Zinc) as chairman of the local arrangements committee. The 1956 Fall Meeting, which will be held concurrently with the parent American Chemical Society, will be at Atlantic City on September 19-21. The Spring, 1957, meeting, which will be a joint meeting with the Rubber Chemistry Division of the Chemical Institute of Canada, will be held on May 15-17, 1957, in Montreal, with O. R. Huggenberger (Dominion Rubber) as chairman of the local arrangements committee. The September, 1957, meeting will be held in New York City.

The winners of the Best Paper Award at the Spring, 1955, meeting were introduced during the business session. These were J. S. Rugg and G. W. Scott, of the Elastomers Division of E. I. du Pont de Nemours & Co., Wilmington, Delaware, for their paper on Adiprene B.

Report by the Historian

Following action taken by the Executive Committee at the Spring, 1955, meeting, an Office of Historian has been established within the Rubber Division. Subsequent to the establishment of this office, Mr. Ball, as chairman, appointed E. V. Osberg, president of National Polychemicals, Inc., Wilmington, Mass., as the division's first Historian. Mr. Osberg rendered his first report at the Philadelphia meeting during the session on Friday morning.

In his initial report, Mr. Osberg outlined events leading to the establishment of the Office of Historian and described some of his initial efforts. He stated that the records of the division from 1930 to the present were in fairly good shape, but those prior to 1930 had mysteriously disappeared from the attic of the old Chemistry Building at the University of Akron where they had been stored by the late Dr. H. E. Simmons, who served as secretary of the division from 1928 to 1935. A search for these old records is being made.

The Historian also indicated that he was corresponding with several of the "old-timers" in an effort to secure an insight into the early trials and tribulations of the division and was engaged in assembling biographical sketches of all past chairmen and secretaries. A photographic file of past officers is also being collated. Mr. Osberg paid special tribute to Lois Brock,

D. C. Maddy

librarian of the General Tire & Rubber Co. at Akron, who has made and is making photographic copies of published information relating to division activities prior to 1930.

During his report, Mr. Osberg made mention of the fact that the Rubber Division was organized on April 7, 1919, and held its first meeting in Philadelphia on September 4 and 5 of that year. He briefly listed the various topics covered by papers at that first meeting, including those on the determination of sulfur in rubber mixtures, the extraction of rubber goods, the theory of balloon fabric protection, the expansion of rubber compounds during vulcanization, the action of certain accelerators during vulcanization, and the variability of natural rubber.

Highlites of the Banquet

The divisional banquet was held in the ballroom of the Bellevue-Stratford Hotel on the evening of Thursday, November 3, with some 750 members and guests in attendance. It was preceded by the Annual Suppliers' Cooperative Cocktail Party, which was held in the Clover and Red Rooms of the hotel. C. A. Bartle (DuPont) was in charge of arrangements for the cocktail party. An even 100 suppliers contributed to the party.

Following dinner, Mr. Ball, who presided at the banquet, made reference to the fact that the first meeting of the Rubber Division was held in Philadelphia in 1919. At that time total membership amounted to 250 and 21 papers were presented at the initial meeting. The Division met again in Philadelphia in September, 1926, at which time the membership had grown to 300. The present meeting, he stated, was the third to be held in Philadelphia, and the division was now one of the largest in the American Chemical Society.

Following the practice of the past few years, the chairman then introduced the left and right end men on the dais who, in turn, introduced those on their respective lefts and rights. Some of the special guests were also introduced, including Alden Emery, ACS secretary, Dr. Jean LeBras, research director of the French Rubber Institute, Dr. Donald Parkinson, formerly of the Dunlop Research Center who recently joined the United Carbon Co., and Dr. Davison, the invitation speaker.

Mr. Ball also took the opportunity to express his thanks to the members of the Executive Committee with whom he had worked the past year as chairman and extended the division's thanks to the local committee in charge of arrangements for the Philadelphia meeting. At this point, a special Certificate of Recognition and a gift certificate were presented to Amos Oakleaf, of the Phillips Chemical Co., who has served as treasurer of the division for the past five years. Mr. Oakleaf, formerly stationed in Akron, was recently transferred to Bartlesville, Oklahoma, and accordingly relinquished the treasurer's post.

A major highlight of the banquet was the presentation of the Charles Goodyear Medal, scroll and honorarium to Dr. Dinsmore. Preceding the presentation, a short talk on "Dinsmore — the Man and His Work" was given by Arthur W. Carpenter, who recently retired from the Goodrich organization. Dr. Carpenter and Dr. Dinsmore were students together at the Massachusetts Institute of Technology.

Dr. Carpenter disclosed that Dr. Dinsmore was a member of the old K_2S Club which subsequently became the Alpha Chi Sigma chapter at MIT. Even at school, he said, Dr. Dinsmore was an avid book reader, tending towards books on philosophy. He told of how "Dinny" graduated in 1914 and how he came to Akron the same year on a motorcycle. He told of his marriage in 1919, from which came two children and three grandchildren. He also traced Dr. Dinsmore's numerous activities in various technical organizations, including his work with the Rubber Division which he served as chairman in 1926-27.

Among the activities with which Dr. Dinsmore was associated were the developments of rayon cord tires, Pliofilm and synthetic rubber. Some of the honors bestowed upon him for these developments, including the Golwyn Gold Medal by the Institution of the Rubber Industry and the honorary degree of doctor of engineering by the Case School of Applied Science, were outlined by the speaker. His work as Assistant Deputy Rubber Director during World War II was also stressed.

Meeting of the 25-Year Club

As usual, the unofficial opening of activities was the luncheon-meeting of the 25-Year Club, membership in which is open to all members of the Rubber Division with at least twenty-five years of service. The Philadelphia meeting had approximately 200 members in attendance and Arthur W. Nellen (Lee Tire) acted as chairman.

A moment's silence was observed in tribute to two members of the Club who have passed on in recent months, namely Messrs. Haslam and Egloff. Several of the new members were introduced and all members who have not yet received their 25-Year Club pins were reminded that they can be secured by writing to Owen Brown of Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass. Dr. Parkinson, who was present, was also introduced.

Following the practice of the Club, a memento was given to the oldest member present in point of service to the field, excluding those who have already secured such mementos. The award at Philadelphia went to Mr. H. B. Underwood, of the Adhesives and Coatings Division of the

A. W. Davison

Minnesota Mining & Manufacturing Co., Detroit, Mich., who has been associated with the rubber industry since 1908.

Mr. Underwood served with the Goodrich organization from 1908 to 1913, was associated with the old Ajax Rubber Company from 1913 to 1930, and served as a consultant for rubber companies in the Chicago and Milwaukee areas for the ten-year period from 1930 to 1940. In 1940 he joined the Ford Motor Company when it installed its tire manufacturing department and remained with that company until 1948. Since that time Mr. Underwood has been associated with Minnesota Mining.

It was announced that the next meeting of the Club will be held during the Spring, 1956, meeting of the Rubber Division at Cleveland, with Dr. F. W. Stavely (Firestone) as chairman.

Credit to Local Committee

Other than the usual hotel difficulties, arrangements for the Philadelphia meeting were well handled by a capable committee. B. S. Garvey, Jr. (Sharples Chemicals) was chairman of the local committee, with A. J. DiMaggio (Firestone) as vice-chairman.

Chairmen of the various subcommittees included the following: *Banquet*, M. A. Youker (DuPont); *Housing*, A. J. DiMaggio (Firestone); *Ladies' Entertainment*, G. J. Wyrough (Wyrough & Loser); *Finance*, A. L. Shaw; *Publicity*, E. J. Strube (DuPont); *Printing*, R. J. Salyerds (Harwick Standard Chemical); *Program and Meeting Rooms*, J. S. Sweeley (Sun Oil); *Registration*, R. A. Garrett (Armstrong Cork).

The program for the ladies included tea and entertainment the first day, a motor tour to Independence Hall and Valley Forge, including luncheon at the famous Bull Tavern, the second day, and a coffee hour on the third day. Another highlite of the meeting was the distribution of copies of the lecture course sponsored by the Philadelphia Rubber Group. These copies, furnished with the compliments of the local group, were given to each registrant at the meeting.

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50TH ANNIVERSARY MEETING HELD BY S.A.E. IN ST. LOUIS

Many interesting and informative papers were presented at the Golden Anniversary Meeting of the Society of Automotive Engineers which was held from October 31 through November 2 at the Chase Hotel in St. Louis, Mo. Among the papers presented at the meeting was one by L. L. Baldwin of the Firestone Tire & Rubber Co., Akron, Ohio. Mr. Baldwin spoke on "Tire Design—Present and Future."

In his paper, Mr. Baldwin stated that recent changes in tire constructions and use of improved materials are making a product which will meet the toughest operating conditions and do so at less cost to the motor carrier. Tubeless tires, drop center rims, weight savings, stronger cord bodies, better cements and dips, treatment of cord, improved synthetic rubber, better traction treads, practical premium treads, specialized tread patterns and better compounding, all are already here. The future certainly will bring more perfection and the possible discovery of new materials and methods of construction to further improve tire design, the author stated.

In his paper on "Progress in Tire Traction," A. H. Easton of the University of Wisconsin, observed that the fact there has been increased research in the field of traction especially in the last decade, is in itself encouraging. To the all-wheel drive, tread pattern and tire chains which have developed over a longer period, we can now add tread treatment, sanders, embedded metal inserts, hydraulic transmissions and special devices, all of which contribute to improved traction. Mr. Easton said that although no traction device within or attached to the tire has yet reached dry pavement performance on wet ice, the ultimate goal, there has been good progress and it is reasonable to expect it to continue.

General Tire Forms New Unit

General Tire and Rubber Co., Akron, Ohio has announced the formation of a flooring division and the development of a new vinyl flooring product. The new division's manufacturing operations will be centered at the company's Jeannette, Penna., plant. Sales will be directed from Akron. J. E. Powers, vice president in charge of plastics said that General Tire follows a logical pattern of integration in forming the new division. He also stated that General's plastics operations realized sales of more than $50,000,000 in the first nine months of the 1955 fiscal year. The new flooring product will be known as "Bolta-Floor." It will be marketed in 27 inch and 54 inch rolls and in commonly used sizes of tile in three thicknesses. Twenty-two plain and marbelized colors will be available. General's plastic division has been marketing a vinyl wall covering known as "Bolta-Wall" as well as sponge rubber rug underlay and "Fashion" fatigue mats.

Advance Solvents and Chemical Corp., 245 Fifth Ave., New York 16, N. Y., has issued a data sheet on "Advastab 50-671," a new polymeric thio organo-tin stabilizer.

PETER P. PINTO ANNOUNCES HIS RETIREMENT FROM "RUBBER AGE"

Peter P. Pinto, who has been associated with RUBBER AGE practically since its first issue in March, 1917, in recent years as treasurer and general manager, has announced his retirement as of December 31, 1955. He will be succeeded as general manager by M. E. Lerner, who has been the editor of the publication since 1934.

Mr. Pinto, or "Pete" as he is known throughout the rubber industry, was born in Italy and was brought to the United States while still a child. He received his primary education in the New York City school system and subsequently attended New York University from which he was graduated in 1915 with a degree in civil engineering. While still at college, he did some part-time drafting work for the *India Rubber World*, serving under Henry C. Pearson, founder and then editor of that journal.

Following his graduation, "Pete" joined the staff of the *World* on a full time basis, but left in April, 1916, to join the Planning and Efficiency Division of the Firestone Tire & Rubber Co. at Akron, Ohio. Here, he made special investigations and reports on both factory and office departments and engaged in industrial efficiency work.

In August, 1917, Mr. Pinto returned to New York and joined the staff of RUBBER AGE, then known as THE RUBBER AGE AND TIRE NEWS, and shortly thereafter became its managing editor. In December of that year, however, he was granted a temporary leave of absence to undertake a special assignment with the Rubber Physical Testing Laboratory of the National Bureau of Standards in Washington, D. C., where he worked with the popular "Judge" P. L. Wormsley.

In February, 1918, "Pete" entered the U. S. Army and in August of that year was appointed a second lieutenant in the Radio Division of the Aviation Service of the Signal Corps. He saw active service in France and was mustered out in February, 1919, at which time he rejoined RUBBER AGE. He has been with this journal continuously.

In addition to his editorial work for RUBBER AGE, Mr. Pinto also contributed a number of general and technical articles on rubber to other publications. One of these was "The Story of Rubber," which was published in the August, 1920, issue of *The Mentor*, a publication devoted to developing popular interest in the arts and sciences. In July, 1925, he gave one of the first radio talks on rubber to be broadcast. He spoke on WJZ in New York City and outlined the workings of the Stevenson Restriction Scheme and its relation to rubber production and prices.

For many years following his work in the editorial department of the publication, "Pete" Pinto served as Advertising Manager, in which capacity he travelled extensively throughout the United States calling on suppliers to the rubber industry. Early in 1946, he relinquished his advertising sales activities to Charles T. Jansen, the present Advertising Manager. Since that time, Mr. Pinto's duties have been largely of a managerial and corporate nature. In 1948 he attended the Second Rubber Technology Conference in London.

Peter P. Pinto

"Pete" Pinto has a host of friends in the rubber industry. He has been active in the Division of Rubber Chemistry of the American Chemical Society and particularly so in the New York Rubber Group. He served as secretary-treasurer of that group in 1932 and 1933, and since 1936 has alternated in that post with B. B. Wilson, general manager of *Rubber World*. To mark their many years of service, the New York Rubber Group is holding a special testimonial meeting in New York City on November 18 dedicated to both of these men.

The steady growth of RUBBER AGE and its recognition today as one of the world's leading rubber journals stems in large part from Mr. Pinto's untiring efforts. His hands have guided this journal through more than three decades—years which have seen the greatest growth in the rubber industry. The industry's only directory—the RUBBER RED BOOK—was Mr. Pinto's "brain child," and he has seen it increase from a thin paper-covered volume in 1937 to the huge 1250 page 1955-56 edition which is now on the press.

While Mr. Pinto is retiring from daily participation in the affairs of RUBBER AGE his years of experience in the rubber industry and in the publishing field will continue to be available to the staff and the management. Late in January, 1956, Mr. and Mrs. Pinto will leave for Florida where they expect to settle.

DUPONT ELASTOMERS DIVISION AGAIN EXPANDS FIELD SALES FORCE

Reflecting the continued growth of demand for neoprene and "Hypalon" chemical rubber, the Elastomers Division of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., is again expanding its field sales force. A. J. Hawkins, Jr., technical sales representative in the Akron district's Houston, Texas, sub-office, has been named to the newly created post of assistant manager of the Los Angeles district. John R. Galloway of the Eastern district's Atlanta sub-office will transfer to the Akron district and succeed Mr. Hawkins in Houston. Edward J. Strube moves from the sales promotion section in Wilmington to the Eastern district, replacing Mr. Galloway in Atlanta.

Richard W. Ward, also of the sales promotion group in Wilmington, has been appointed technical sales representative in the New England district, serving the Connecticut territory. He succeeds Robert A. Hammond, who will move to Montague, Mich., to aid in the start-up next year at the company's new neoprene plant there. Don R. Kuespert, compounder at the division's Akron Rubber Laboratory, has transferred to the sales promotion section in Wilmington, replacing Mr. Strube.

Effective Transfer Dates

Transfers of Messrs. Ward and Kuespert become effective immediately. Mr. Strube was scheduled to begin his duties in Atlanta on November 15, and Mr. Galloway is to move to Houston a month later. On February 1, Mr. Hawkins will go to Wilmington, and the technical laboratory at Deepwater Point, N. J., to study the products of the Dyes and Chemicals Division. He will report to Los Angeles about April 1.

Mr. Hawkins is a native of Birmingham, Alabama, and was graduated from Alabama Polytechnic Institute in 1941 with a bachelor of science degree. Following graduation he joined DuPont as a chemist at the Rubber Laboratory in Deepwater Point, N. J. His work was temporarily interrupted during the war when he served as major of paratroops with the U. S. Army in Europe.

In 1945 Mr. Hawkins returned to DuPont's Rubber Laboratory where he was employed as chemist until his transfer in 1946 to the Wilmington office as sales correspondent. From late 1946 until he took up his Houston post in 1953 he served as technical sales representative in both the Los Angeles and Chicago districts.

During 1949 Mr. Hawkins was secretary of the Los Angeles Rubber Group, and in 1950 was elected to the group's board of directors. He was secretary and vice-president of the Chicago Rubber Group in 1951 and 1952, and served a portion of a term as president until his transfer to Houston. Mr. Hawkins is a member of Phi Lambda Upsilon chemical fraternity and Sigma Alpha Epsilon social fraternity.

Mr. Galloway, born in Richmond, Indiana, received his bachelor of science degree in chemical engineering in 1942 and his master's degree in chemical engineering in 1947, both from Purdue University. During the war he served as a lieutenant in the Naval Air Corps. In 1947 he became a compounder at the DuPont Rubber Laboratory in Deepwater Point, N. J. where he engaged in research and development work on neoprene latex. The latter part of 1952 Mr. Galloway was assigned to the Atlanta office as technical sales representative.

Mr. Galloway has made a number of contributions to the technical literature on use of neoprene. He is a member of the American Chemical Society, the Catalyst chemical fraternity, and Sigma Alpha Epsilon social fraternity.

Mr. Strube, originally from Schenectady, N. Y., majored in chemistry at Union College, and was graduated from Florida Southern College in early 1951 with a bachelor of science degree. In 1953 he became a rubber technologist for DuPont and engaged in work on wire coverings and mechanical goods of neoprene and "Hypalon" chemical rubber.

Before joining DuPont, Mr. Strube worked in the technical department of the Thermoid Rubber Co. and as a chemist for the Bishop Manufacturing Corp. Mr. Strube has written numerous articles on "Hypalon" and rubber chemicals. He is a member of Tau Kappa Epsilon social fraternity.

A native of New York City, Mr. Ward was graduated from Yale University with a degree in chemical engineering in 1949. The same year he became a development engineer for the U. S. Rubber Company in Providence, R. I. Mr. Ward joined DuPont in 1952 as a rubber technologist at the Deepwater Rubber Laboratory where he engaged in technical sales service and development work on neoprene latex. The latter part of 1954 and until his transfer to the Wilmington office early this year, he worked on mechanical goods of neoprene and "Hypalon." Active in the New York and Boston Rubber Groups, Mr. Ward is a member of the American Chemical Society.

Mr. Kuespert hails from South Bend, Ind., and received his bachelor of science degree in chemical engineering in 1952 from Purdue University. Upon graduation he was employed by DuPont as a compounder at the Rubber Laboratory in Deepwater Point where he worked on adhesives and sponge compounding. During the summer of 1953 Mr. Kuespert was transferred to the Akron Laboratory where he engaged in development and sales service work on mechanical goods, rolls, sponges, and metal adhesives.

Adds Two Lauryl Alcohols

Two new lauryl alcohols, designated "Dytol J-68" and "95% Lauryl Alcohol," have been added to its list of "Dytol" higher fatty alcohols, Rohm & Haas Co., Philadelphia, Penna., has announced. Containing approximately 80% C_{12} alcohol, Dytol J-68 is available in drums and tankcar quantities. According to the company, it should prove particularly interesting in applications where the yield of C_{12} derivatives is important. Although Dytol J-68 contains 8 to 10% more C_{12} alcohol than Dytol A-24, it is available at the same 40c per pound tankcar price. 95% Lauryl Alcohol may be obtained in developmental quantities only, at the standard developmental price of $2.00 per pound. In commercial quantities, available on relatively short notice, the tankcar price for 95% Lauryl Alcohol would be 43c per pound. As anti-foaming and emulsifying agents, these new Dytol alcohols are said to be of interest in a variety of fields. For textile and surface-active agent applications, they serve as finishing and softening agents or as emulsifiers and detergents. Dytol alcohols also function as additives for cosmetic creams, intermediates for polymerization regulators for synthetic rubber, for viscosity index improvers and pour point depressants in lubricating oils, and for quarternary ammonium compounds.

D. R. Kuespert

E. J. Strube

A. J. Hawkins, Jr.

R. W. Ward

J. R. Galloway

Sarbach Joins Hewitt-Robins

Donald V. Sarbach

Donald V. Sarbach has been appointed to the newly-created position of research director of Hewitt-Robins, Inc., Stamford, Conn. He will be a member of the company's executive staff in Stamford and will serve in an advisory and consulting capacity to technical and research departments at manufacturing plants in Buffalo, N. Y., Passaic, N. J., Fremont, O., and Chicago. Mr. Sarbach comes to Hewitt-Robins from the B. F. Goodrich Co., Akron, Ohio, where he was technical manager for development of new industrial products, and before that was manager of the general chemical laboratories. During his 18 years at Goodrich he was awarded 30 patents on various rubber and chemical products and processes. Among his more recent achievements are the development of an air-porous vinyl coated fabric for upholstery and sportswear, a high-temperature insulating material for rockets and guided missiles, and a liner for the tubeless tire. He also has done extensive development work on synthetic rubber and plastics, including the new polyurethane plastic expected to become an important factor in the foam cushioning field.

Ladd Joins Foster D. Snell

Foster D. Snell Inc., New York, N. Y., has announced the appointment of William A. Ladd to its staff of consulting chemists and engineers. Mr. Ladd, a pioneer in electron microscopy, was associated with Columbian Carbon Co. for 15 years where he led in using the electron beam to picture and measure the extremely fine particles of carbon black. His work there included studies on combustion, graphite, pigments, rubber, latices, inks, paints, iron oxides, and particularly the sizes, shapes and structures of infinitesimal particles far smaller than light microscopes can resolve. He was a member of the original group at the University of Toronto, headed by Professor E. F. Burton, that pioneered the use of the electron microscope in North America. Mr. Ladd envisions the application of the electron microscope to production and quality control. By constantly inspecting the particles for any deviation during production, the electron microscope will provide "feed-back" information to maintain high quality products.

Employment Opportunities

The Naval Air Material Center, Philadelphia 12, Penna., has announced an urgent need for qualified engineers, electronic scientists, metallurgists, physicists, physiologists, psychologists and technologists. The Center is currently engaged in an extensive program of aeronautical research, development, experimentation and test operations for the advancement of Naval aviation. Engineering vacancies exist in the following options: Electrical, Electronics, General, Industrial, Mechanical, Structural and Aeronautical (various sub-options). Starting salaries range from $3,670 to $8,990 per annum. Application for Federal Employment, Standard Form 57, should be filed with the Industrial Relations Department, Naval Air Material Center, Naval Base, Philadelphia 12, Penna. Applications may be obtained from the above address or information as to where they are available may be obtained from any first or second class post office.

Constructing Hypalon Plant

Plans for the construction of the first full-scale plant for the manufacture of "Hypalon" chemical rubber at Beaumont, Texas, have been announced by E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. The new production facility will be located at DuPont's Beaumont Works which started operation a year ago with the manufacture of methionine, an essential amino acid used as a poultry feed supplement. "Hypalon" chlorosulfonated polyethylene is a synthetic rubber developed by DuPont research. Limited quantities for trade evaluation and market development purposes have been supplied by an interim plant at Belle, West Va. Scheduled for completion during the first part of 1957, the new plant will consist of two new manufacturing buildings and a single-story warehouse. Additions and alterations to existing power and service facilities at the Beaumont Works will also be made. Approximately 200 men will be employed during the peak of construction. When completed, about 70 men will be required to operate the new plant.

Goodyear Research Appointments

Dr. R. J. Osterhoff, director of research for the Goodyear Tire & Rubber Co., Akron, Ohio, has announced several new appointments to the research staff of the company. Dr. J. D. Hauenstein has joined the High Polymer Section of the Research Division as a research chemist, while John R. Wilson has also been appointed to the High Polymer Research Section. Donald J. Molenaur has joined the section as a research assistant. Robert J. Koch has joined the Diene Synthetic Rubbers Section of the Research Division.

Tillis Forms Rolis Company

Robert Tillis

Robert Tillis, formerly director of engineering and manufacturing for the United Rubber Machinery Exchange, Newark, N. J., has announced the formation of Rolis, Inc., a new firm offering complete manufacturing and engineering services to the rubber and plastic industries. Rolis, Inc., maintains plant and offices at 1240 East 14th St., Brooklyn 30, N. Y. The new organization sells both new, custom-designed machinery and rebuilt equipment. Rolis provides free maintenance and offers installation advice. Special engineering services, including detailed plant layouts, are also available.

Promoted to Vice-President

The appointment of D. B. Benedict as a vice-president of the Carbide and Carbon Chemicals Co., New York, N. Y., was recently announced. Mr. Benedict will be responsible for the company's long range planning in certain research and development activities, as well as all programs on synthetic fibers. Mr. Benedict was graduated from the University of Michigan with the degree of bachelor of science in 1932. He received the degree of master of science in chemical engineering from the same University in 1933. In the same year, Mr. Benedict began his employment with Carbide as a technical assistant in the Chlorhydrin Department at the company's South Charleston, West Va., plant. He progressed through a number of positions at the South Charleston plant, becoming assistant superintendent of chemicals and resins in 1940 and general superintendent of the plant in 1952. He was transferred to the New York office in November, 1953, when he became assistant works manager. In June, 1954, he was appointed works manager of the company.

Adhesives Firms Merge

Arthur Mayer, vice-president in charge of sales for Federal Adhesives Corp., Brooklyn, N. Y., has announced the merger of Federal Adhesives with the Imperial Adhesives Co. Alvin A. Edison and Jules S. Yurman, formerly of Imperial Adhesives, have joined the staff of Federal Adhesives as sales executives.

TWO PAPERS ON CARBON BLACK HEARD BY BOSTON RUBBER GROUP

The October 14th meeting of the Boston Rubber Group held at the Somerset Hotel in Boston, Mass., heard two interesting papers on the subject of carbon black. Dr. Carl W. Sweitzer, director of research and development for the Columbian Carbon Co., presented a paper on "Research Trends in Carbon Black", and Lloyd D. Treleaven, technical service engineer with Columbian Carbon, presented a paper on "Some Functional Aspects of Carbon Black".

In his paper, Dr. Sweitzer said that phases of carbon black technology are under continuing and intensive investigation, to meet the varying and increasing demands of the rubber industry. Adding to the problem is the gradual conversion of carbon black operations to oil furnace processes, necessitated by the changing economic picture on hydrocarbon raw materials. This conversion has introduced further problems on quality evaluation, performance in application and bulk handling, Dr. Sweitzer said.

All intrinsic properties of carbon blacks are under intensive study, to determine those primarily associated with behavior in rubber. Although particle size, surface area, size distribution and other well-known standard properties have been pretty well rationalized, investigations on these properties are required in connection with the new oil blacks. The greatest interest today lies in the identification and evaluation of the functional groups, as well as active sites, on the carbon black surface, that are directly involved in the rubber-carbon interaction or bond.

Surface Characteristics

Evidence points to the importance of such surface characteristics as the peripheral crystallite pattern within the carbon particle, as well as certain oxygen-containing terminal groups such as the quinones. As this picture becomes rationalized the development of further surface-improved carbon blacks for rubber reinforcement becomes a distinct possibility.

Extensive research is continuing as well on the carbon-rubber interaction, employing physical testing as well as chemical approaches. The thermodynamic approach of Mullins, Parkinson and others, had led to a better understanding of the physical nature of the carbon-rubber bond. The chemical approach of numerous investigators in America, Australia and elsewhere, involving particularly studies on carbon gel and the role of mixing temperature and oxidation, is gradually providing a clearer picture of the chemical forces probably involved in this carbon-rubber interaction, he stated.

In summary, the research in carbon black technology is more active than ever, with the carbon black industry contributing greatly, and with the possibility of significant advances in the near future most promising, Dr. Sweitzer concluded.

In his paper on some fundamental aspects of carbon black, Mr. Treleaven stated that carbon blacks play an essential role in the field of mechanical rubber goods compounding. He reviewed the basic concepts of carbon black, including methods of production and the basic colloidal properties known as building stones, namely, surface chemistry, particle size and structure. He also discussed briefly the associated building stone, carbon gel. This review laid the groundwork for the main topic concerning performance of carbon blacks in elastomeric compounds.

Mechanical goods compounders are confronted daily with the problem of meeting continually changing demands of compounding called for by automotive, ASTM, SAE and military specifications. Not only are they faced with actual physical specifications, but also the associated problems of curing, processing, extrusion, mixing and calendering.

Simplified Data Presented

Recognizing these problems, and realizing that we are contributing at least to a degree to the problem with the many different types of carbon black, simplified data were developed presenting the effects of the rubber grades of carbon black over a full range of loadings on such properties as Mooney viscosity, Mooney scorch, extrusion performance, extrusion swell, electrical conductivity and resistivity and, finally, actual physical development such as tensile, elongation, modulus and rebound. Slides demonstrating these properties were presented on the rubber grade carbon blacks in Neoprene GN-A and LTP; these two polymers being the prime elastomers for mechanical rubber goods.

In closing the following thought was left with those in attendance, i.e., a basic knowledge of the properties of carbon black is an important asset to the mechanical rubber goods compounder. With such knowledge he can be in a position to design compounds to obtain better processing and to meet rigid customer specification requirements in his vulcanized products.

Grand Jury Probing Price Fixing

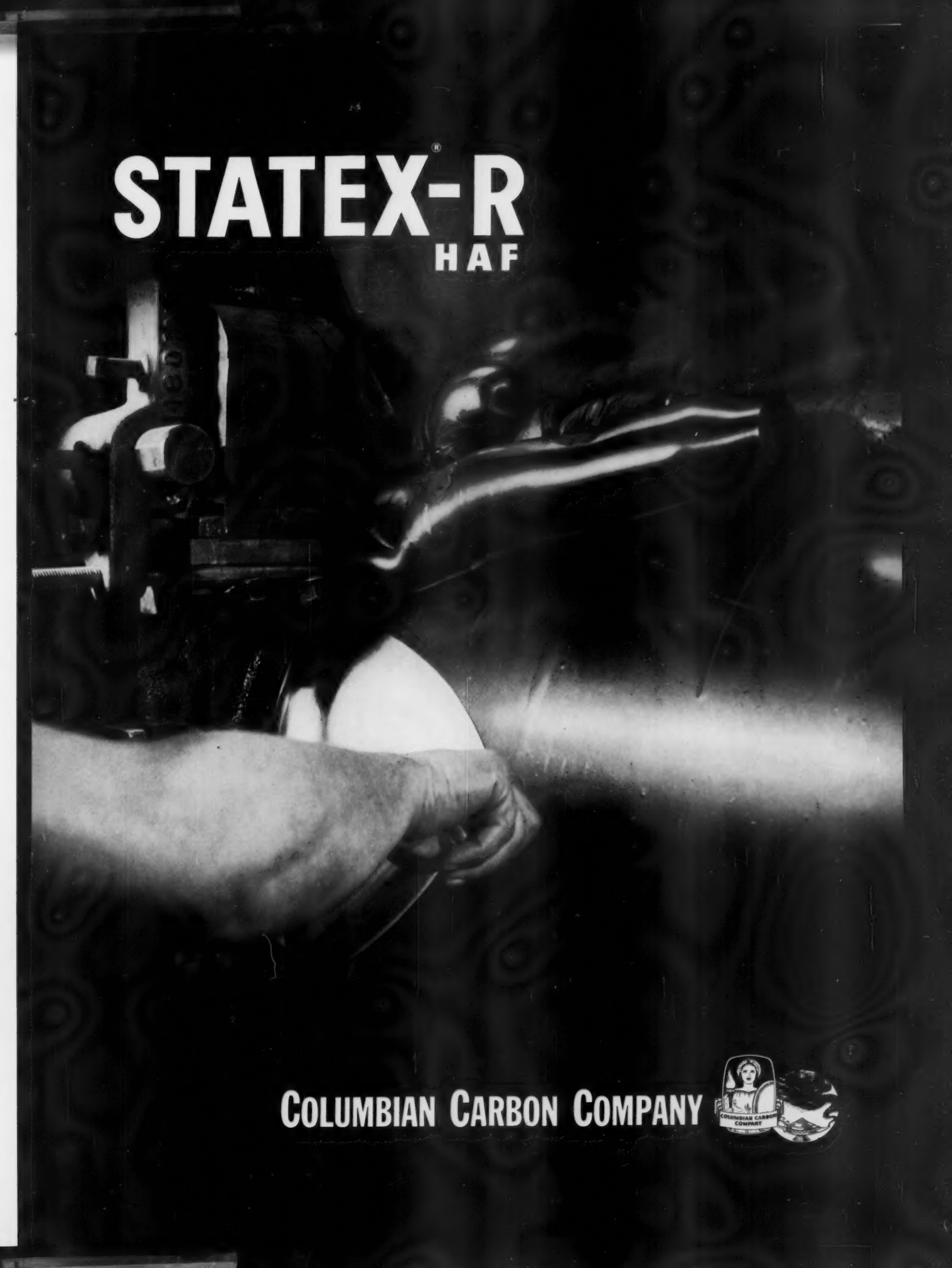
According to the *Denver Post* a sweeping probe by Colorado's federal grand jury into alleged price fixing and monopoly practices in the nation's rubber belt industry involves at least twenty firms headquartered in seven states. The newspaper states that the list of firms whose records have been placed before the 23-member jury include the following: Gates Rubber Co., American Pulley Co., New York Belting & Packing Co., R. J. Dick & Co., Acme Rubber Co., Mercer Rubber Co., Buffalo Weaving & Belting Co., Quaker Rubber Corp., Dodge Manufacturing Co., Firestone Tire & Rubber Co., U. S. Rubber Co., Raybestos-Manhattan, Inc., Thermoid Co., Browning Manufacturing Co., Snyder Corp., M. L. Snyder and Son, Hamilton Manufacturing Co., and the B. F. Goodrich Co.

Eberhard Faber Plans Move

Eberhard Faber Pencil Co., Brooklyn, N. Y., has announced plans to move its Greenpoint, Brooklyn, N. Y. plant to an industrial park near Wilkes-Barre, Penna., next September. It is understood that construction of the Wilkes-Barre plant will begin immediately, but the pencil firm will stay in its present location until next fall. The new plant will reportedly employ 500 persons initially, and 1,200 when it goes into full production.

GOODYEAR SHIPPING GIANT CONVEYOR BELT ROLLS FOR STEEL MILL USE

Conveyor belt rolls, each five feet wide, 1,400 feet long and weighing twenty tons apiece, are now being shipped from Plant 2 of the Goodyear Tire & Rubber Co. in Akron, Ohio, to a steel mill in Sparrows Point, Md. The big belts, constructed of tough rubber compounds and seven plies of super-rayon fabric, reinforced to resist impact, are slated for a new ore-handling system at the Sparrows Point Mill. South American ore will be unloaded directly from ships to conveyor belts, then carried by belt direct to production or stockpiles. Other belts will carry stockpiled ore to production as schedules permit. The new installation will provide automation in handling one of the basic ingredients of steel.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ELASTOMER & PLASTICS GROUP HEARS CARVER ON FAR EAST

The October 18th meeting of the Elastomer and Plastics Group of the Northeastern Section of the American Chemical Society, held at the Museum of Science in Boston, Mass., featured an election of officers for the 1955 season and an address by Leslie D. Carver, export technical sales manager of the Witco Chemical Co. and the Continental Carbon Co., both of New York, N. Y.

The new chairman of the group is Charles S. Frary, Jr. (Boston Woven Hose), and the chairman-elect is John B. Gregory (Frederick S. Bacon Laboratories). Max Taitel (Union Bay State Laboratories) has been elected secretary-treasurer of the group, while James H. Fitzgerald (Harwick-Standard) has been elected custodian. Marvin J. Wilner (Plymouth Rubber) has been named a member of the Executive Committee.

In his talk, Mr. Carver covered the rubber companies in his 23,000 mile trip through Japan, the Philippines, Australia and New Zealand in the spring of 1955. He described some of the Japanese factories and their raw materials, indicating how rubber is secured on barter from Indonesia for cotton goods. Japanese factories need much new equipment and technical assistance, but they have well-informed technicians, excess help and fair to good materials. There is a considerable amount of carbon black made from anthracene oil, but 13,322,000 pounds of American blacks were imported in 1954. Although many high-grade products were examined—hose, belting, tires, and tubes—much of the production is of poor quality, to meet prices.

The Philippines produce their own rubber, and the only large factory produces shoes for domestic consumption, Mr. Carver declared.

Unrest in Far East

Singapore was seething with social unrest, while on the mainland of Malaya the Communist terrorists were destroying rubber trees and murdering planters and helpers. The dense jungles of the area hamper the efforts of the British to apprehend the offenders, Mr. Carver said.

Australian rubber plants were large, progressive and well-informed. Fall tubeless tires were shown in April. American GR-S was just beginning to become available, though natural rubber is in general use. 34,319,000 pounds of American Black were imported in 1954. Country roads probably account for much of the short life of the Australian tires.

New Zealand's favorable trade balance in wool, and the large dairy and pulp industries provide a base for a well-rounded rubber industry. 3,250,000 pounds of carbon black were imported from America in 1954. A great desire for American GR-S was found everywhere, he observed.

Indoil Chemical Co., 910 S. Michigan Ave., Chicago 80, Ill., has issued a technical data sheet on the effect of "Indonex" plasticizers in Banbury mixing.

Coming Events

Dec. 1. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Dec. 1. Rhode Island Rubber Club, Fall Meeting, Pawtucket Country Club, Pawtucket, R. I.

Dec. 6-7. Society of the Plastics Industry, Sixth Film, Sheeting and Coated Fabrics Division Conference, Hotel Commodore, New York, N. Y.

Dec. 7. Buffalo Rubber Group, Xmas Party, Buffalo Trap and Field Club, Buffalo, N. Y.

Dec. 9. Detroit Rubber and Plastics Group, Annual Christmas Party, Sheraton-Cadillac Hotel, Detroit, Mich.

Dec. 9. New York Rubber Group, Xmas Party, Henry Hudson Hotel, New York, N. Y.

Dec. 10. Northern California Rubber Group, Xmas Party, Moose Club, Oakland, Calif.

Dec. 10. Southern Ohio Rubber Group, Xmas Party, Miami Valley Golf Club.

Dec. 16. Boston Rubber Group, Xmas Party, Somerset Hotel, Boston, Mass.

Dec. 16. Chicago Rubber Group.

Dec. 16. Los Angeles Rubber Group, Xmas Party, Ambassador Hotel, Los Angeles, Calif.

Jan. 27, 1956. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Feb. 9, 1956. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Feb. 17, 1956. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Feb. 27 to Mar. 2, 1956. American Society for Testing Materials, Committee Week, Hotel Statler, Buffalo, N. Y.

Mar. 16, 1956. Chicago Rubber Group, Furniture Club, Chicago, Ill.

Apr. 6, 1956. Akron Rubber Group, Mayflower Hotel, Akron, Ohio.

Apr. 12, 1956. Fort Wayne Rubber and Plastics Group, Hotel Van Orman, Fort Wayne, Ind.

Apr. 27, 1956. Chicago Rubber Group, Furniture Club, Chicago, Ill.

May 16-18, 1956. Division of Rubber Chemistry, A.C.S., Hotel Cleveland, Cleveland, Ohio.

June 17-22, 1956. American Society for Testing Materials, 59th Annual Meeting, Chalfonte-Haddon Hall, Atlantic City, N. J.

ONTARIO SECTION HEARS SEAR ON PRINCIPLES OF ADHESION

Approximately 115 members and guests of the Ontario Rubber Section of the Chemical Institute of Canada attended the October 11th meeting held at the Pickfair Restaurant in Toronto, Ont., Canada. Principal speaker of the meeting was Derik W. Sear of the Dunlop Research Centre, Dunlop Rubber Co., London, England. Mr. Sear spoke on the "Principles of Adhesion in Relation to Practice".

Mr. Sear stated that the establishment of a bond between surfaces by means of an adhesive depends, for the most part, on the utilization of the forces of attraction which exist between atoms and molecules. These forces can also act at an interface between an adherend and adhesive to give specific adhesion. This is distinct from mechanical interlocking which occurs when the adhesive is able to penetrate the surface of a porous adherend.

The forces of attraction between atoms and molecules at an interface, just as between atoms and molecules away from the interface, are very dependent upon their distance apart for their strength of interaction, the speaker stated. It is essential, therefore, that at some stage prior to setting up, the adhesive be fluid. This will allow orientation and hence maximum interaction with the adherend surface.

Contaminant-Free Surfaces

The adherend surface must be free of contaminants which would cause interference. Therefore, the adhesive must wet the surface which is indicated by the angle of contact which is obtained when equilibrium is reached. If the angle of contact is less than 90° then wetting is said to take place and the adhesive molecules show a greater attraction for the surface than for each other.

Conversely, if the angle of contact is greater than 90°, then wetting does not take place and the adhesive tends to form droplets, leading to a discontinuous film, which is a source of weakness.

Mr. Sear observed that it is also essential for the attainment of good adhesive bonds that during "setting up", stresses are not formed within the joint which would also tend to lower the bond strength.

Launches Major Expansion

General Mills, Inc., Minneapolis, Minn., has launched a major expansion of its plastic balloon manufacturing facilities. The company, which has a 30,000 square foot balloon factory in Minneapolis, opened an additional 40,000 square feet in leased quarters in a St. Paul manufacturing building. The company will increase its balloon production employes from the present 250 to 375. The firm disclosed for the first time that its balloon operations now are a $6,000,000 a year business, compared to $100,000 eight years ago. The new facilities will enable General Mills to build its giant high-altitude balloons, which are up to 285 feet tall, on straight production lines 285 feet long, rather than on curved or horseshoe shaped lines as is done in the Minneapolis plant.

NEW YORK GROUP REPORTS ON ELASTOMER COURSE STATISTICS

C. V. Lundberg, chairman of the Educational Committee of the New York Rubber Group, reports that 158 persons have enrolled in the group's course in "Elastomer Technology". The course began on October 3 and will run through January 30, 1956. Class sessions are held once a week and for two hour periods. At the time of enrollment, 93 students were members and 65 were non-members. By registering for the course, the non-members automatically became members as their registration fee included membership dues.

It is reported than 80% of the registrants hold degrees. This is broken down to show 97 bachelors, 20 masters and 6 doctors. One hundred and four registrants are engaged in laboratory work, forty-two are involved in plant operations, twenty-two handle office affairs and thirty-one are in sales. These figures include more than one classification of work by many of the registrants.

A further study of the student body reveals that thirty-three have spent one year or less in the rubber business. Thirty-six have spent two to five years; forty have been in the business for six to ten years; thirty-seven have been in the business for eleven to twenty years; ten have been in the field for twenty-one to thirty years, and two students have more than thirty years in the business.

Selected Lecture Staff

The lecture staff for the course has been selected from industry and all lecturers are well qualified to speak on their particular subjects. The full program of the course follows:

October 3—"Introduction to the Course" by C. V. Lundberg (Bell Telephone Laboratories), and "Natural Rubber" by C. E. Rhines (U. S. Rubber).

October 10—"Butadiene-Styrene Rubber" by E. L. Borg (Naugatuck Chemical).

October 17—"Classes and Properties of Compounding Materials for Use in Elastomers" by I. Drogin (United Carbon).

October 24—"Compounding for Specific Effects and Measurement of Physical Properties" by T. D. Bolt (Godfrey L. Cabot).

October 31—"Reclaimed Rubber" by J. M. Ball (Midwest Rubber Reclaiming), and "Butyl Rubber" by R. L. Zapp (Esso Research and Engineering).

November 7 — "Nitrile Rubber" and "Acrylic Ester Copolymers" by N. G. Duke (Goodrich Chemical) and "Silicone Rubber" by J. J. Deasy (General Electric).

November 14—"Neoprene" and "Hypalon" by C. E. McCormack (DuPont).

November 28—"Thiokol" by J. S. Jorczak (Thiokol) and "Isocyanates" by R. R. Radcliff (DuPont).

December 5—"Chemistry of Rubber Vulcanization" and "Physics of Rubber" by F. W. Boggs (U. S. Rubber).

December 12—"Polymer Degradation" by G. H. Hunt (Simplex Wire and Cable).

December 19—"Polyethylene" by R. J. Lurie (Bakelite).

Calls for Trained Chemists

The greatest need in the synthetic rubber industry is trained polymer chemists, specializing in research on giant, multi-unit molecules, John E. Caskey, vice-president and general manager of the Naugatuck Chemical Division of the U. S. Rubber Co., said recently. "America's synthetic rubber industry is redoubling its research efforts since changing from government to free hands and is faced with a shortage of chemists trained in polymer science—the science of working with large molecules," Mr. Caskey declared. "Since synthetic rubber offers broad opportunities to the polymer chemist, and the need for these chemists is also growing in other industries, this branch of chemistry should be seriously considered by the student chemist. It should also be considered by the many colleges and universities who do not have polymer chemistry courses in their curriculum," Mr. Caskey stated.

January 9—"Thermoplastic Elastomers: PVC Compounds" by C. E. Schildknecht (Stevens Institute).

January 16—"Latex, Sponge and Foam" by G. G. Winspear (R. T. Vanderbilt).

January 23—"Resins and Resins in Rubber" (To be announced).

January 30—"Rubber Processing Equipment, Plant Layout, Plant Problems" (To be announced).

Goodrich Develops New Fiber

A man-made fiber different chemically "from any now on the market" has been developed by B. F. Goodrich Chemical Co., Cleveland, Ohio, according to John R. Hoover, president. Mr. Hoover said the material, which the company has named "Darlan," is now in pilot plant production at Avon Lake, Ohio. Darlan is versatile, he said, and can be adapted for almost every type of wearing apparel ranging from sweaters and knit goods to coats and suits. Mr. Hoover said the new fiber, in a soft, fur-like texture, will be used for the first time in women's luxury pile coats to be introduced in a number of leading retail stores across the nation later this year. "Similar marketing tests are planned," he said, "for other luxury wearing apparel in the near future." "Darlan is a dinitrile fiber on which our research and development teams have been working for several years. The dinitrile chemical, (1, 1 dicyanoethylene) was a theoretical material as far back as World War 1, but it had never been successfully produced heretofore. "B. F. Goodrich holds more than 45 patents covering the fiber," he said.

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CHICAGO GROUP HEARS POPP ON A NEW ERA IN RUBBER

The October 7th meeting of the Chicago Rubber Group, held at the Furniture Mart in Chicago, Ill., was addressed by George E. Popp, domestic sales manager of the Phillips Chemical Co., Akron, Ohio. Mr. Popp's paper was entitled, "A New Era in Rubber". The speaker began his talk with a brief historical review of the important rubber developments in this country from the time of the Japanese invasion of Malaya to the present day.

Mr. Popp also offered an analysis of rubber consumption based on current statistics, and on the basis of these figures estimated that world consumption by 1960 will approximate 3,500,000 long tons. He stated that the U. S. percentage of world consumption has declined slowly in the last thirty-five years and that this decline will accelerate in the next few years.

He pointed out that the annual per capita consumption of new rubber in the United States is approximately 19 pounds a year. This is considerably higher than the world average (one pound) which should increase over the next few years to provide a healthy growth condition.

Even if we do not consider India, China, Russia and Africa, Mr. Popp declared, there is a vast but undeveloped potential market for rubber and rubber products in Europe and South America over and above the expanding market in the United States. This market must be met almost entirely by synthetic rubber.

Automobiles On Increase

In the United States, the number of cars per family is on the increase and has just passed the point of one car per family. Rubber consumption per registered vehicle has increased over the years and in the future will, at the very least, hold its own. He also pointed out that the number of registered cars on the road should increase approximately 15% in the next five years. All of this adds up to a very healthy situation for the rubber industry, the speaker declared.

Having cited the probable causes and effects which should be conducive to continual growth for the rubber industry, Mr. Popp noted recently announced plant expansions which will contribute an additional 175,000 tons of synthetic rubber yearly by 1957. The sale of the synthetic rubber plants to private industry, he said, has fostered intense competition, and this produces a healthy situation for the consumer.

The speaker stated that it is not possible at this time to predict all of the improvements which will be forthcoming. He listed several possibilities, however, which may lead to revolutionary advances which, in turn, will be of immense value to the consumer. Among the possibilities listed, were: (1) New monomers, (2) Improvements in oil and carbon black masters by use of better dispersants and improved techniques; (3) New synthetic rubbers (having natural X-ray pattern); (4) New polymerization techniques and recipes; (5) Polyurethanes; (6) Isocyanates; (7) Vinylpyridine rubber, and (8) Improved packaging and handling.

Appointed Chief Engineer

D. L. Matthews

D. L. Matthews has been appointed chief engineer of Goodrich-Gulf Chemicals, Inc., with headquarters at the company's home office in Cleveland, Ohio. Mr. Matthews, former B. F. Goodrich Chemical Co., general chemicals plant manager at Avon Lake, Ohio, recently returned to this country from England. While there he supervised a plastics plant expansion for British Geon, Ltd., which is an affiliate of Goodrich Chemical. The new chief engineer was graduated from Iowa State College with a B. S. in mechanical engineering in 1935. He worked with the United States Gypsum Co. as a plant engineer until 1940, when he joined the Goodrich organization in Akron as a maintenance engineer. In 1941, he became a construction supervisor in Akron, and later that year was sent to Louisville as a construction engineer for the building of a polyvinyl chloride plastics plant. In 1943, Mr. Matthews was appointed plant engineer at Louisville, and he held that position until 1950 when he was assigned to Avon Lake to supervise construction of a plastics plant. In 1951 Mr. Matthews became general chemicals plant manager at Avon Lake. In 1954, he was sent on special assignment to England to supervise a polyvinyl chloride plant expansion. He returned to this country in August, 1955 to resume his duties as general chemicals plant manager at Avon Lake. Mr. Matthews is a member of the American Institute of Chemical Engineers and the Professional Engineers Association of Kentucky.

Bennett Death Ruled Suicide

The recent death of Irving T. Bennett, chairman of the board and chief executive officer of the General Cable Corp., as reported in the October, 1955, issue of RUBBER AGE, has been ruled a suicide by the Westchester County (N.Y.) medical examiner. The medical examiner stated that Mr. Bennett had taken a poisonous dose of barbiturates while temporarily mentally disturbed.

FINANCIAL BRIEFS

James R. MacDonald, president of the General Cable Corp., has acquired 17,500 shares of common stock through a stock option, thus increasing his direct holdings to 25,000 shares.

Pyramid Rubber Co. has purchased 22,700 common shares in A. G. Spalding & Bros., Inc., increasing its direct holdings to 72,400 shares.

S. H. Martin, Jr., vice-president of the Thiokol Chemical Corp., has acquired 630 common shares through a stock option, increasing his direct holdings to 2,444.

F. K. Schoenfeld, vice-president of the B. F. Goodrich Co., has purchased 1,068 common shares, increasing his direct holdings to 4,062 shares.

J. K. Schneider, vice-president of the General Cable Corp., has acquired 5,500 common shares through a stock option, increasing his direct holdings to 8,600. O. G. Garner, vice-president, has acquired 2,500 common shares through a stock option, increasing his holdings to 4,000.

J. W. Keener, vice-president of the B. F. Goodrich Co., has bought 4,082 shares of company common stock, increasing his direct holdings to 10,540.

P. W. Litchfield, chairman of the board of the Goodyear Tire & Rubber Co. has acquired 22,144 common shares through stock option. Mr. Litchfield's direct holdings now total 46,704 shares.

Producing Lithopone Yellows

Kentucky Color & Chemical Co., Louisville, Ky., has announced that it is now in production on a series of cadmium lithopone yellows in primrose, lemon and medium shades. For over 15 years Kentucky Color has been one of the leading producers of pure cadmium toners and has just recently installed equipment to produce lithopone type yellows. These pigments are particularly adapted to heat resistant enamels, emulsion paints, leather finishes, tin printing inks, and plastic applications of all types and are particularly advantageous where heat stability, alkali resistance and fastness to light are important. The new pigments will be manufactured in Louisville and warehoused at New York, Boston, Atlanta, Kansas City, Dallas, Houston, Los Angeles, San Francisco, Milwaukee, Pittsburgh, Portland, and Seattle.

Footwear Prices Raised

Tyer Rubber Co., Andover, Mass., has increased the price of its rubber footwear by approximately 10%. The Goodyear Footwear Corp. of Providence, R. I., also increased its prices but a company spokesman stated that it was not the policy of the firm to disclose the amount or the effective date. The Footwear Division of the U. S. Rubber Co. set the pace on October 1, when it raised prices about 10%.

Seiberling Appoints Sherry

Frank Sherry

Frank Sherry has been named manager of the Newcomerstown, Ohio, plant of the Seiberling Rubber Company's Plastics Division. Mr. Sherry succeeds C. F. Biggs, who returns to the company's main factory in Akron on special assignment in the office of the production superintendent. A native of Southampton, N. Y., Mr. Sherry attended schools there. He was graduated from Rensselaer Polytechnic Institute in Troy, N. Y., with a bachelor's degree in chemical engineering in 1941. Mr. Sherry had been associated with the B. F. Goodrich Co. since 1941, serving as production manager of the firm's Plastics Products Division in Marietta, Ohio, since 1952.

A native of Lincoln, Nebraska, he was graduated from the University of Nebraska in 1934 with a bachelor's degree in science and chemistry, following which he completed three years of post-graduate work in chemistry. He is a member of Phi Lambda Upsilon Society, a national honorary chemical fraternity, and Alpha Chi Sigma, national professional chemistry fraternity. He is a member of the American Chemical Society and the American Rocket Society.

Belt Line Plan Dead

A proposal by Passenger Belt Conveyors Inc., of Akron, Ohio to install a passenger conveyor belt to replace New York's old subway shuttle system has been sidetracked indefinitely. The bid, in excess of $3,000,000 was submitted by Passenger Belt Conveyors last December to cover the installation of a belt system in the subway between Times Square and Grand Central Station, a distance of a half mile. The bidder is a jointly owned subsidiary of Goodyear Tire and Rubber Co. and Stephens-Adamson Manufacturing Co., Aurora, Ill.

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CURRENT ROLE OF GOVERNMENT IN RUBBER RESEARCH OUTLINED

Ever since the government acted to dispose of its synthetic rubber producing facilities to private industry, much interest has centered about the future role of the government in rubber research. When most of the synthetic rubber facilities were transferred to industry last June, the administration of the government research program was shifted to the National Science Foundation.

On August 15, as reported in RUBBER AGE, NSF announced the appointment of an eleven member commission to develop recommendations on the future role of the federal government in basic research on synthetic rubber. The research commission was set up upon the recommendation of the Rubber Producing Facilities Disposal Commission.

In the thirteen years since its inception, about $30,000,000 in federal funds went into the research program. Last year's budget was $4,160,000. The government laboratory at the University of Akron represents an investment of $2,200,000 which includes the original cost of the facility plus additions.

The research grants now under NSF jurisdiction extend to June 30, 1956, at which time, it is expected, Congress will have decided what to do about government research activities. There follows below a listing of basic research grants; to whom the grants have been awarded; what the grants cover, and the amounts involved in the current fiscal year and the two preceding fiscal years:

Burke Research Co., Van Dyke, Mich.—For work toward improving synthetic rubber for use in heavy duty tyres. The project involves research on improving elastomers and improving the reinforcing agents. Amount of grant for current fiscal year, about $150,000. Grants in previous years: fiscal 1955, $150,000; fiscal 1954, $170,000.

Case Institute of Technology, Cleveland, Ohio — Investigation of fundamental physico-chemical properties of synthetic latices and polymer substitutes. Development of methods for studying such systems. Development of instruments to improve the study and evaluation of such systems. Current year, $70,000. Grants in previous years: fiscal 1955, $70,000; fiscal 1954, $90,000.

University of Chicago, Chicago, Ill.—Determination of mechanism of the scission of carbon-carbon bonds by light and oxygen in presence of additives. It has been shown that it is possible to alter completely the nature of products formed in a given free radical reaction using so-called "free radical trappers" which stabilize the free radicals. It is proposed to extend their use to the polymerization and co-polymerization of monomers. It appears that important improvements in properties of a copolymer can be effected and which will yield a polymer of high intrinsic viscosity.

An attempt will be made to introduce directly certain functional groups into preformed polymer molecules and to condense these groups with appropriate bifunctional compounds—development of methods for stabilization of monomers in the vapour stage and in storage—continuation of basic research on free radical mechanisms of reaction. Current year, $55,000. Grants in previous years: fiscal 1955, $55,000; fiscal 1954, $69,000.

Cornell University, Ithaca, N. Y.—Determination of molecular structure of polymers in their different physical forms and the relation of such structures to overall mechanical or electrical properties. Various types of polymers will be subjected to measurement of their osmotic pressure, heat of fusion, viscosity, light scattering, rate of crystallization, stress - strain - temperature studies, dielectric frequency effects, field induced diffraction, etc. It is anticipated that these studies will lead to knowledge of molecular weight and molecular weight distribution of polymers and will provide fundamental data on which to base necessary theories of polymerization and properties of polymers. Current year, $68,000. Grants in previous years: fiscal 1955, $70,000; fiscal 1954, $79,000.

Cornell University, Ithaca, N. Y. — A project, the immediate aim of which is to elucidate stepwise the mechanism of transformations through which natural rubber is synthesized in latex-bearing plants. The ultimate aim is to uncover new ideas that may be developed into novel approaches making synthetic rubber by methods which are fundamentally different from those now in use. An organic chemist and a plant physiologist are jointly conducting this research. Postulated intermediates and rubber precursors, tagged with radio-carbon are tested on latex-producing plants to determine whether or not they are concerned in the biosynthesis of rubber. Various possible isoprenoid intermediates will be synthesized which contain carbon-14 and their fate in latex-producing plants will be established. Current year, $20,000. Grants in previous years: fiscal 1955, $30,000; fiscal 1954, $33,000.

University of Illinois, Urbana, Ill.—Preparation of new polymers which may meet needs of the Defense Department—low hysteresis values needed in large truck tyres and stable at high temperatures. Also seeking knowledge on the relation between structures of polymers and their properties using approaches of organic and physical chemistry. Synthesis of thermostable polymers will be attempted using chelate complexes of phenolic Schiff bases containing divalent metal ions of zinc, copper, nickel and iron. Encouraging results have been obtained in synthesis of copolymers from butadiene and analogues of benzalacetophenone which show low heat build-up. These leads will be followed actively. Other new polymers will be prepared which may possess oil-resistant properties. Physical chemical investigation will be directed to obtaining knowledge of properties of macromolecules in solution with particular reference to dimensions (sizes and shapes) of polymers and physical interactions between polymer molecules. An understanding of these subjects should aid in designing the best possible elastomers. Current year, $135,000. Grants in previous years: fiscal 1955, $120,000; fiscal 1954, $140,000.

Mellon Institute of Industrial Research, University of Pittsburgh, Pittsburgh, Penna.—The project concerns the relationship between various aspects of structure and the physical properties of synthetic rubber. The study will include: (1) development and application of methods for determining structure of synthetic elastomers: (a) X-ray and birefringence studies of crystallinity and orientation in synthetic elastomers; (b) determination of molecular weights and dimensions by osmometry, light scattering, and viscometry for analytical purposes and for estimating degree of branding. (2) Development and application of methods for investigating physical properties of polymers: (a) study of low frequency dynamic behaviour of solid polymers with major objective of assessing effect of structure, molecular weight, extent of cross-linking, fillers, etc., on dynamic loss factor (this is closely related to heat build-up); (b) rheological investigations of polymers and their concentrated solutions to understand better fundamental properties underlying processing characteristics and industrial physical tests; (c) study of tensile strength and stress-strain properties of elastomers including investigation of mechanism of breaking and role of cross-linking, orientation and crystallization. Current year, $109,000. Grants in previous years: fiscal 1955, $100,000; fiscal 1954, $115,000.

PARTICIPANTS IN PRESENT GOVERNMENT RUBBER RESEARCH PROGRAMS

Company	*Location*	*Amount of Grant* — *Fiscal 1956*	*Fiscal 1955*	*Fiscal 1954*
Burke Research Company	Van Dyke, Michigan	$150,000[a]	$150,000	$170,000
Case Institute of Technology	Cleveland, Ohio	70,000	70,000	90,000
University of Chicago	Chicago, Illinois	55,000	55,000	69,000
Cornell University[b]	Ithaca, New York	68,000	70,000	79,000
Cornell University	Ithaca, New York	20,000	30,000	33,000
University of Illinois	Urbana, Illinois	135,000	120,000	140,000
Mellon Institute of Industrial Research	University of Pittsburgh Pittsburgh, Penna.	109,000	100,000	115,000
Massachusetts Institute of Technology	Cambridge, Mass.	105,000	805,000	86,000
University of Minnesota	Minneapolis, Minnesota	80,000	80,000	90,000
National Bureau of Standards	Washington, D. C.	150,000[a]	.....	.....

Notes: (a) Approximately. (b) Cornell University has two separate research grants.

Massachusetts Institute of Technology, Cambridge, Mass.—Project involves the Alfin polymerization process. Catalyst consists of metalated hydrocarbon, the metal being sodium or potassium. Studied will be new methods for metalation simplifying preparation of catalysts. Also, the effects of associated salts upon reactions induced by sodium and sodium reagents; also, changes in type of polymer caused by changes in composition of catalysts; also investigation of the catalysts and condition for preparing Alfin polymers which can be handled by present compounding methods. (For the first six months, Godfrey L. Cabot, Inc., of Boston, will have a sub-contract to study and to determine if Alfin polymers can be handled successfully by industry if proper care is given to details. This will demonstrate the possibility of industrial application). Current year, $105,000. Grants in previous years: fiscal 1955, $805,000; fiscal 1954, $86,000.

University of Minnesota, Minneapolis, Minn.—It is still not known why variations in polymerization technique affect the quality of the product. Thus, kind and amount of shaking and pre-shaking before polymerization has a marked influence on polymer which is produced, but the reason is not understood. It is not known why different hydroperoxides cause greatly different rates of polymerization nor is the effect of addition of "boosters" during polymerization understood. Studies will be made on the kinetics and mechanism of emulsion polymerization which may lead to understanding of these and other effects. They will include (1) effect of kind and amount of hydroperoxide on polymerization; (2) modification of polymerization by means of high molecular weight mercaptans; (3) mechanism of action of retarders; (4) role of persulphate in polymerization. Current year, $80,000. Grants in previous years: fiscal 1955, $80,000; fiscal 1954, $90,000.

National Bureau of Standards, U. S. Department of Commerce, Washington, D. C.—(1) Determination of fundamental physical and chemical properties of synthetic rubbers and related elastomers and of monomers and other materials used in their manufacture. (2) Development and improvement of test methods for evaluating synthetic rubbers and for correlating properties with structure (infra-red and ultraviolet spectroscopy analysis). Improved physical methods will be developed for evaluating and characterizing rubbers. (3) Development of basic information on power loss and operating temperatures of tyres to aid in design of better synthetic rubber tyres. Object is to design tyres with minimum amount of generated heat. Current year, about $150,000 to $200,000.

To Inspect Atomic Data

Three Akron rubber companies, the Firestone Tire and Rubber Co., B. F. Goodrich Co. and Goodyear Tire and Rubber Co., have received Government permission to inspect secret information about civilian uses of atomic energy. The Goodyear Tire and Rubber Co. has been in the field of atomic power about two years through a subsidiary, the Goodyear Atomic Corp.

OLD SIGN SERVES AS REMINDER OF PROGRESS MADE IN LAST 30 YEARS

H. F. Jacober, technical superintendent of the Baldwin Rubber Co., Pontiac, Mich., has brought to our attention the photograph which appears above. It will be seen that the sign on the side of the barn advertises "Portage" tires which have not been made for at least thirty years. Of particular interest is the fact that the sign emphasizes "5,000 miles." In the light of current advances in the tire industry, it is hard to believe, says Mr. Jacober, that any tire company "might have been proud enough to advertise 5,000 miles." It is believed that the barn shown in the photograph above is actually some thirty miles outside of Chicago, Ill.

Herkness Named Vice-President

Wayne Harkness, II has been named vice-president of the United Carbon Co., Inc., Charleston, West Va., and will have charge of the company's foreign operations, according to Oscar Nelson, Jr., executive vice-president of the company. A member of the United Carbon staff since 1951, Mr. Herkness formerly was associated with the Charles Eneu Johnson Co., of Philadelphia, Penn., of which his father, Col. L. C. Herkness, USA (Ret.), is chairman of the board of directors. The Johnson company is a United Carbon Co. subsidiary, engaged in the manufacturing and sale of printing inks. Mr Herkness is a graduate of the William Penn Charter School of Philadelphia and of the United States Naval Academy. During World War II he commanded the USS Alden and USS Mayo, and at the time of his resignation from the Navy held the rank of commander. In his new capacity, Mr. Herkness will have his headquarters at Charleston, but will spend much of his time overseas in connection with company sales and plant operations.

G-E Announces Price Rises

What is said to be the first general price increase in plastics manufacturing since 1952 has been announced by the Plastics Department of the General Electric Co., Pittsfield, Mass., effective September 15. Prices have been increased according to the following pattern: injection molding (thermoplastic components) up to 3%; compression molding (thermosetting components) up 4%; silicone rubber components up to 4%; G-E mycalex components up 5%; sealing caps and sleeves up 5%.

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To Hold Special Meeting

Directors of the Goodyear Tire & Rubber Co. voted on October 11 to call a special meeting of stockholders on November 22 to act on two proposals: (1) Adoption of a new Code of Regulations, modernized to conform to the new Ohio Corporation Act which became effective on October 11; (2) Approval of a revised employee pension program recently negotiated with the unions representing various groups of employees. One of the principal changes under the new regulations will be a change in the date of the annual meeting from the last Monday in March to the first Monday in April. The Goodyear directors also authorized a regular quarterly dividend of 50 cents a share on the common stock, payable December 15 to stockholders of record November 15. Election of Kenneth A. Spencer of Kansas City, Mo., as a director of the Goodyear Tire & Rubber Company was announced by P. W. Litchfield, chairman of the board, after the meeting. His election fills a vacancy on the Goodyear board created by the death of George A. Sloan. Mr. Spencer is president of the Spencer Chemical Co., president of the Pittsburgh & Midway Coal Mining C[illegible]d a director of many companies.

Building Illinois Plant

General Cable Corp., New York, N. Y., has announced plans to construct a new plant in Monticello, Ill., for the manufacture of paper telephone cable. The plant, located on a 35-acre tract, will occupy some 50,000 square feet. The initial plant facilities will be completed shortly and will be in full operation by the end of the year. It is expected that the new plant will employ about 100 people at the start.

SUPREME COURT TO REVIEW DUPONT ANTI-TRUST CASE

The Supreme Court on October 10, agreed to review a lower court decision dismissing the government's six-year-old anti-trust suit against E. I. du Pont de Nemours & Co. The government contends that DuPont ownership of slightly more than 23% of General Motors Corp. common stock gives DuPont illegal "working control" of the automobile company. It wants the courts to order DuPont to sell the stock.

Judge Walter J. LaBuy, of the United States District Court in Chicago, rejected the government's charges last December. He said the government had "failed to prove conspiracy, monopolization, a restraint of trade or any reasonable probability of restraint."

The government asked the Supreme Court to review Judge LaBuy's decision because it maintains that he used the wrong legal standards. It insists that DuPont not only controls General Motors but that it has used its control to restrain trade between the two corporations. It told the high court in a brief that Judge LaBuy's finding "is patently erroneous because it ignores the realities of intercorporate relations."

DuPont had asked the Supreme Court to reject the government's appeal. It said the appeal does not raise an issue of substance and Judge LaBuy's ruling should be affirmed.

Justices Tom C. Clark and John Marshall Harlan did not take part in the court's decision to review the lower court ruling. Justice Clark, who then was Attorney General, filed the anti-trust suit against DuPont June 30, 1949. Justice Harlan was one of the DuPont defense attorneys in the lower court proceedings.

Biggest Anti-Trust Suit

The case is the biggest anti-trust suit in history. Mr. Clark said when it was filed that the suit was brought to break up "the largest single concentration of economic power in the United States."

The government in its original suit sought to force the sale of stock holdings in General Motors and the U. S. Rubber Co. Judge LaBuy turned down both pleas and the Justice Department decided to ask for Supreme Court review of only the General Motors part of the action.

The government told the Supreme Court in its appeal brief that the DuPont-General Motors case is of "key importance in the industrial world." It said the question of whether the two "economic giants" should continue "interlocked" is of "obvious importance" to the United States economy.

Justice Department attorneys stated that they believe it will be the spring or perhaps even the fall of 1956 before the Supreme Court hears the appeal. They explained that a voluminous lower court record must be printed before the court can set a hearing date. The government and the defense offered a total of 1,506 exhibits and called forty-nine witnesses. Judge LaBuy handed down a 220-page printed decision.

Several alternatives are said to be open to the high court when it comes time to rule on the appeal: It can uphold Judge LaBuy's dismissal of the case. If it decides instead to reverse the lower court, it either can find that Judge LaBuy used the wrong legal standards and order him to re-examine the evidence in the light of the proper standards; or it can reverse him outright and rule that the government proved its anti-trust charges.

The government contends that DuPont has violated the major United States anti-trust statutes: the Sherman act and the Clayton act. It maintains that DuPont through its 23% stock ownership has exercised control of General Motors in a manner that has caused General Motors to buy from DuPont rather than from DuPont's competitors. It also insists that General Motors has agreed to give DuPont exclusive rights to any General Motors chemical discoveries and has turned over to DuPont tetraethyl lead, synthetic rubber developments, and Freon.

Judge LaBuy specifically rejected each of these charges. He said the "essence of the controversy" was the government's claim that DuPont stock ownership had limited General Motors' ability to buy freely from competitors of DuPont and U. S. Rubber.

The Justice Department reiterated in its brief to the Supreme Court that General Motors on occasion "made substantial purchases from DuPont although prices of competing sellers were lower." DuPont in its brief said Judge LaBuy had reached the proper decision in ruling that General Motors used "its own unfettered judgment."

Milestone

Publishers, like other businessmen, regard business volume as one concrete measure of achievement. In our case, advertising and subscription revenue constitute volume—and this November issue of RUBBER AGE is noteworthy in that it contains, for the first time in our history, a volume of 100 pages of paid advertising. Actually, the total is somewhat above 100 pages, an achievement for which we are deeply grateful to our advertisers.

The publishers of RUBBER AGE realize that no achievement is possible without the loyal support and active interest of our readers, and so to them also our sincere thanks. We hope that our future efforts, with planned improvements, will continue to merit the support and interest of both reader and advertiser.

THE PUBLISHERS

Western Catalog Available

Western Supplies Co., 2900 Cass Ave., St. Louis 6, Mo., has made available its new catalog of dies and machines for cutting, perforating, flash trimming and electronic sealing. The new catalog shows a variety of dies made especially for the rubber and plastics industries. Copies may be obtained by writing the company.

SUIT AGAINST THERMOID CO. DISMISSED BY N. J. COURT

A suit charging five officials and employees of the Thermoid Co., Trenton, N. J., with manipulating the firm's books to avoid federal taxes has been dismissed by the New Jersey Superior Court. The court issued the dismissal order on the grounds that the attorney for Peter Bothner, who brought the suit, said his client could not post a security to indemnify the defendants against costs and counsel fees.

Mr. Bothner, a Brooklyn, N. Y., stockholder in Thermoid, charged the five defendants "by devious methods, schemes and devices" juggled transactions among Thermoid subsidiaries to avoid federal corporation taxes in 1951, 1952 and 1953. He also charged that the firm was billed for expenses run up for the benefit of defendants.

Earlier Control Battle

A stockholder group tried to win control of the company earlier this year, but the management board of directors slate won in an election.

Defendants in the suit were Frederic E. Schluter, former chairman who resigned because of ill health; George S. Fabel, former president; Russell H. Temple, treasurer; Edgar N. Noel, former chief accountant, and Willis B. Oram, former head of the Cost Department.

Upon hearing about the dismissal of the suit, Mr. Schluter commented: "This dismissal by the Superior Court proves our statement when the law suit was filed that it was part of a smear campaign. The suit was instigated for publicity purposes during the proxy campaign. It is regrettable that this method of filing a suit can be used for publicity purposes during a proxy fight."

Named Banbury Sales Manager

Farrel-Birmingham Co., Inc., Ansonia, Conn., has announced the appointment of Richard N. Comes to the position of manager of Banbury mixer sales. Mr. Comes is succeeded as field sales engineer in New England by Richard D. Mace who will now handle the sale of the company's line of rubber and plastics processing machinery in this territory. Mr. Comes, who graduated from Lehigh University in 1951 with a degree in mechanical engineering, joined Farrel-Birmingham in the same year as a student engineer. He became a technical assistant in 1953, was appointed sales engineer in June 1954, and in August 1954 was placed in charge of the New England territory. Mr. Mace, whose career up to the present has been in the company's foundries, began as a pattern-maker apprentice in 1923. In 1953 he was appointed assistant superintendent of foundries, the position he held until currently joining the company's sales division.

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Gracia Named to New Post

Albert J. Gracia

Albert J. Gracia, formerly general manager of the Goodyear Atomic Corp., Portsmouth, Ohio, has been named manager of research and development for the Goodyear Tire & Rubber Co., Akron, Ohio. Mr. Gracia joined the Goodyear organization in 1928 on research assignments. Later the same year, he was transferred to chemical engineering duties and in 1942 was named manager of the Chemical Engineering Division. During World War II, he was put in charge of the company's chemical engineering on synthetic rubber and played an important role in the development of the continuous polymerization process of synthetic rubber production. Following World War II, Mr. Gracia was named to head the company's new chemical engineering laboratories and in 1950 became assistant manager of research and development. In 1952, he was appointed manager of Goodyear Atomic Corp., the Goodyear subsidiary selected to operate the government's atomic energy installation in Portsmouth. Mr. Gracia, a graduate of the Massachusetts Institute of Technology, is a member of the American Chemical Society and the American Institute of chemical engineers. He has been succeeded as general manager of Goodyear Atomic by Donald H. Francis, former manager of development engineering for that company.

To Produce A.M.F. Mixer

Girdler Co., Louisville, Ky., and the American Machine & Foundry Co., New York, N. Y., have concluded a licensing agreement calling for Girdler to be the exclusive manufacturer of the A.M.F. continuous mixer and the A.M.F. continuous disc blender. The agreement also gives Girdler the exclusive right to market the equipment, except in the foam rubber, bakery, butter and margarine fields. Announcement of the agreement was made by John E. Slaughter, Jr., Girdler vice-president. Girdler is a division of the National Cylinder Gas Co., Chicago, Ill. Mr. Slaughter points out that the A.M.F. equipment will complement Girdler's Votator processing apparatus, which is widely employed in the food, textile, chemical and petroleum fields.

LABOR NOTES

New contracts covering three plants of the Midwest Rubber Reclaiming Co. have been signed by the company and the United Rubber Workers, C.I.O. The contract follows the pattern set previously in the rubber industry, general 12-cent-an-hour raise, vacation improvements, seventh paid holiday and wage adjustments for certain workers on top of the 12 cent boost. In addition two and a half weeks' vacation now go to employes with 11 to 15 years of service. They had been getting two weeks. The employes will also get pay for jury service at an overtime rate.

Richardson Co., Chicago, Ill., and the U.R.W. closely following the 1955 wage pattern set in negotiations with the industry's "Big Four" firms, have signed an agreement covering 1,800 in six cities. Richardson and the union agreed on 11-cent hourly raises in plants at New Brunswick, N. J., Indianapolis and Melrose Park, Ill., and 14 cents at plants in Tyler, Tex., Ogden, Utah and Noonan, Ga.

Stockholders of U. S. Rubber Co. recently approved a change in the company's pension plan. The change approved was an increase in the minimum pension allowance to $1.80 a month for each year of service up to 30 years, which the employe will receive in addition to social security benefits. The previous minimum had been a fixed amount, including social security. It ranged from $100 to $125 a month, depending on length of service.

H. E. Humphreys Jr., chairman of the company, said the increased cost resulting from this change and other new pension benefits during the next five years would average about $207,500 a year. The revision was a part of an agreement reached on July 15 between the company and the U.R.W. This agreement included other changes in the company's pension plan, not subject to approval by the stockholders. It makes employes eligible for a pension after 15 years of service at age 65, instead of after 20 years as formerly.

Named Purchasing Director

Earle T. Runcie has been appointed director of purchases for the Witco Chemical Co., New York, N. Y. In his new position, Mr. Runcie will be responsible for company wide purchasing policies and the supervision of all plant purchasing personnel. Mr. Runcie will make his headquarters in the executive offices of the company, at 122 East 42nd St., New York, N. Y. He comes to Witco from The Continental Carbon Co., a Witco affiliate, where he was special assistant to the executive vice-president and manager of the Oil and Gas Divisions. He formerly had been manager of purchases of that company and a partner in his own successful company. Mr. Runcie graduated from Purdue University in 1940 as a mechanical engineer. He is a member of the Texas Mid-Continent Oil & Gas Association, the Petroleum Club of Houston, and a former member of Texas Panhandle Purchasing Agents Association.

Keach Elected Vice-President

J. Robert Keach

The election of J. Robert Keach as a vice-president of the Thermoid Co., Trenton, N. J., has been announced by Warren Hill, president. Mr. Keach has been manager of Thermoid's industrial Rubber Sales Division, since he joined the company in August, 1953. Mr. Keach has had more than 30 years experience in the rubber industry. Before joining Thermoid, Mr. Keach was associated with the Quaker Rubber Co., of Philadelphia as vice-president and general manager. Prior to that, he was general plant manager of the Industrial Rubber Division of the Firestone Tire & Rubber Co. A native of Indiana, he is a graduate of Butler University.

Tracerlab to Construct Plant

Tracerlab Inc., Boston, Mass., has announced plans for the construction of a new plant in Waltham, Mass. to manufacture atomic instruments and chemicals. The plant, comprising 164,000 square feet, will not only house Tracerlab, but also certain operations of its subsidiary, Keleket X-Ray Corp. The plant will be completed in the summer of 1956. Established less than 10 years ago, Tracerlab's operations have grown from $30,000 in 1946 to over $12,000,000 in 1954. Besides its production facilities for radioactive chemicals, the plant will also house Tracerlab's manufacturing equipment for medical and laboratory instruments, as well as its industrial division, which concentrates on application of radioactive isotopes and nuclear instruments to industrial process control.

Named General Cable Chairman

James R. MacDonald has been elected chairman of the board of General Cable Corp., New York, N. Y. He will continue as president of the firm. Mr. MacDonald has been president of the company since 1951, and prior to that he served as first vice-president for four years. The new chairman of the board joined General Cable in 1940 as assistant to the vice-president in charge of sales and a year later became vice-president of sales and a director of the corporation.

Names in the News

WILFRED A. SMITH, associated with the B. F. Goodrich Co. since 1924, has been named manager of new products sales for the Industrial Products Division.

PHILIP A. BURGHART, formerly associated with the Antara Chemicals Division of the General Aniline and Film Corp., has been named head of the Market Development Section, Chemicals Division, Houdry Process Corp., Philadelphia, Penna.

WILLIAM C. RUSSELL has been appointed general manager of the St. Louis Division of the Joy Manufacturing Co., Pittsburgh, Penna. He was formerly sales manager and chief engineer of Dodge & Seymour, Ltd., New York, N. Y.

EDWIN J. THOMAS, president of the Goodyear Tire & Rubber Co., has been elected to the board of directors of Procter & Gamble.

DR. CHARLES F. FUCHS, vice-president and technical director of the Emulsol Corp., Chicago, Ill., has been elected to the company's board of directors.

CHARLES E. SAUVAIN, secretary of the Mohawk Rubber Co., has been named board president of the Akron Automobile Association.

ROGER S. FIRESTONE, president of the Firestone Plastics Co., Pottstown, Penna., has been elected a vice-president of the new Research and Educational Foundation established by United Cerebral Palsy and a group of industrialists. Mr. Firestone is also National Campaign Chairman for UCP.

GEORGE A. SACKETT, formerly associated with the Repair Material Development Department of the Goodyear Tire & Rubber Co., has been appointed director of repair material development for the Armstrong Rubber Co., West Haven, Conn.

RICHARD H. BRUCE, formerly eastern zone manager for molding materials for the Bakelite Co., New York, N. Y., has been appointed manager of the Molding Materials Division of the company.

NEAL J. CRAIN, director of purchases for the United Engineering and Foundry Co. since 1951, has been elected vice-president in charge of purchases.

BERT CREMERS, vice-president and general manager of the Michigan Alkali Division of the Wyandotte Chemicals Corp., and FORD BALLANTYNE, JR., vice-president and general manager of the J. B. Ford Division, have been elected directors of the company.

R. C. WOERNER has been named director of the process engineering and design department of the Petro-Tex Chemical Corp. of Houston, Texas. Mr. Woerner was formerly general superintendent.

DR. WORTH WADE has been named staff assistant to the chairman of the board of the American Viscose Corp., Philadelphia, Penna. In his new post, Dr. Wade will have charge of patent licensing and will assist the management in new product planning and patent policies.

TOM KERESTES has been appointed assistant sales manager of the Kraft Chemical Co., Chicago, Ill.

ROBERT C. HOUSER, formerly assistant treasurer for the H. K. Porter Co., New York, N. Y., has been elected treasurer succeeding JAMES C. LESLIE, who recently resigned to become president of the Holgate Co., Kane, Penna.

R. KIRBY SHIRLEY and PEARSON E. NEAMAN have been elected senior vice-presidents of the Freeport Sulphur Co., New York, N. Y. Mr. Shirley is also treasurer of the company, while Mr. Neaman is general counsel.

Water Soluble Poly Soap

General Latex & Chemical Corp., Cambridge, Md., announces that it is now supplying a new water soluble polymeric soap with a molecular weight of about 30,000. The material is being supplied as a medium tan-colored aqueous solution of 10% active solid content. With many soap-like properties, it does not impair surface tension lowering and is low in froth production. It has properties of emulsification and can disperse many materials. The new product finds uses in emulsion polymerization stabilizing and in keeping viscosity low during polymerization and concentration.

Katt Named to New Post

Appointment of E. M. Katt, former engineer in the Chemical Engineering Department at the Goodyear Tire and Rubber Co., to the newly established Bench-Scale Piloting Section of the Research Division, has been announced by Dr. H. J. Osterhof, director of research. Mr. Katt first joined Goodyear in 1942 as a member of the production squadron and shortly after was transferred to the Chemical Engineering Department. He was born in Garland, Neb., and attended the University of Nebraska where he received a degree of bachelor of science in chemical engineering.

Mock Joins "Rubber Age"

John Mock

John Mock, formerly associated with the Precision Rubber Products Corp. of Dayton, Ohio, as assistant chief chemist, has joined the staff of RUBBER AGE as assistant editor. Born in Springfield, Ohio, and a graduate of the University of Dayton, Mr. Mock, in addition to his work in the field of rubber chemistry, has had experience in journalism. During his career with Precision Rubber, Mr. Mock was engaged in developmental work and other research activities. He has completed development projects relating to every type of elastomer and, in addition, has developed compounds for the military services. One of these has been approved as Air Force Specification MIL-G-5510. Mr. Mock has also done extensive work with new polymers. In his new assignment, Mr. Mock will make his home in the New York area. He is a member of the Southern Ohio and New York Rubber Groups.

Pilot Plant Site Selected

Avon Lake, Ohio will be the site of a pilot plant to be constructed by Goodrich-Gulf Chemicals, Inc., for the production of a synthetic rubber which duplicates tree rubber, it has been announced by W. I. Burt, Goodrich-Gulf president. Goodrich-Gulf Chemicals, Inc., is jointly owned by the B. F. Goodrich Company and the Gulf Oil Corp. B. F. Goodrich Chemical Co., a division of B. F. Goodrich, presently has an experimental station and other operations at Avon Lake and the new plant will be located in that area, the company announced. Synthetic rubber having the same molecular structure as tree rubber was first produced last year by a team of Goodrich-Gulf scientists working in the B. F. Goodrich Company Research Center, Brecksville, Ohio. Large truck tires made of the new rubber are now giving road services and mileage comparable to tires made wholly of crude rubber, it is said. Truck tires, until now, required tree rubber to assure acceptable performance. Construction work on the new plant at Avon Lake will begin immediately and the facility is expected to be in operation next year, according to Mr. Burt.

Uva Appointed Chief Chemist

P. A. Uva

P. A. Uva, formerly assistant chief chemist of the Avon Sole Co., Avon, Mass., has been appointed chief chemist succeeding Laurence C. Shaw, who has retired after 42 years with the company. Mr. Uva has been associated with Avon Sole in various capacities since 1929. Mr. Uva participated in the development of "Avonite" and "Cush-N-Crepe", two well-known Avon products. He is a member of the Division of Rubber Chemistry of the American Chemical Society, the Boston and Rhode Island Rubber Groups, the Elastomer and Plastics Group, and the American Society for Testing Materials. In 1950, he served on the Executive Committee of the Boston Rubber Group. John P. Nolan has been named to assist Mr. Uva as laboratory manager and plant chemist. Mr. Nolan received his B. S. degree in chemical engineering from Northeastern University in 1949. William J. Perkins has been named development chemist. He is also a graduate of Northeastern University and received his B. S. degree in chemical engineering in 1940.

Mr. Shaw joined Avon Sole in 1914. He received a B. S. degree from the Massachusetts Institute of Technology in 1910. Mr. Shaw has been active in the Division of Rubber Chemistry and as a member of both the Boston and Rhode Island Rubber Groups. He is well-known in Masonic circles and is a member of the New York and Scottish Rites. He is retiring to his estate on Cape Cod.

Israeli Unit Sues Albert

General Tire & Rubber Co., Ltd., of Tel Aviv, Israel, a subsidiary of the General Tire & Rubber Co., Akron, Ohio, has filed suit against L. Albert & Son and the Israel H. Albert Foundation, both of Akron, for $270,000. The suit charges the Foundation with being $209.916 in arrears on 90,000 shares it allegedly bought in the Israeli firm. L. Albert & Son, it is charged, owes the Israeli firm $65,000 as the balance due on the purchase of 93,000 shares. General Tire opened the Tel Aviv operations in 1952, serving as a minority stockholder and furnishing technical know-how. Mixed American and Israeli capital supplied the rest of the cash.

Phillips Licenses Union Carbide

Union Carbide and Carbon Corp., New York, N. Y., has concluded an agreement with the Phillips Petroleum Co., Bartlesville, Okla., for a license under the Phillips' patents involving low-pressure polyethylene. According to George C. Miller, president of the Bakelite Co., a Union Carbide division, Carbide has rights to produce polyethylene of the general types presently identified by the Phillips trademark "Marlex". This polyethylene is described by Mr. Miller as "a high-strength, semi-rigid, thermoplastic that may be processed on standard equipment to make pipe, housewares, film, bottles, and electrical insulation. Although the material is of the same general type, it presently differs somewhat in certain properties from low-pressure polyethylene obtained by the Ziegler Process, under which Carbide is also licensed. Poylethylenes produced by the so-called low-pressure Phillips or Ziegler techniques differ markedly from the conventional high-pressure poylethylene in strength, stiffness, distortion point, and vapor transmission. These new low-pressure polyethylenes are expected to find a ready market", Mr. Miller said.

Mr. Miller stated that Bakelite "has thoroughly surveyed the potential market for the newer low-pressure polyethylenes. Although these materials when readily available are expected to have some effect on markets presently served by high-pressure process poylethylene, we feel the major effect will be on markets currently served by other materials." Mr. Miller pointed out that "Union Carbide, as the world's largest producer of the popular high-pressure process poylethylene, with a production capacity of more than 225,000,000 pounds per year from three plants in West Virginia and Texas, has still another plant of 60,000,000 pounds per year capacity coming into production in the near future at Torrance, California."

Army Produces Fast Balloon

An improved balloon that can rise straighter and faster than older types and therefore better collect weather data has been produced by the Army Signal Corps. The device, called an "Express Balloon," was disclosed recently at the Evans Signal Laboratory, Belmar, N. J. It is made of neoprene and is seven feet in diameter, one foot larger than previous weather balloons. It is inflated with 300 cubic feet of hydrogen, twice as much as is used in standard types. The larger volume of gas permits the Express Baloon to rise almost vertically at an average speed of 1,800 feet a minute to a maximum height of fifteen miles. Older balloons rose at 1,000 feet a minute and often wandered out of radio range. The Express Balloon carries aloft a radiosonde that transmits to the ground station the air pressure, temperature, humidity and wind speed at various levels of the atmosphere. The data are used for weather forecasting, airplane flights and firing guided missiles and artillery.

Krouse Joins Thiokol Chemical

Eugene A. Krouse

Eugene A. Krouse has joined the staff of the Thiokol Chemical Corp., Trenton, N. J., as a technical sales representative. He is now engaged in selling Thiokol's polysulfide liquid polymers, plasticizers, oil- and solvent-resistant synthetic rubbers, and the new "Thiokol" VA-7 liquid aliphatic vulcanizing agent. Mr. Krouse was formerly with the North American Smelting Co. and then with the Cox and Tanz Advertising Agency, as account executive. He was later associated with the Maltbie Laboratory Division of Wallace and Tiernan as a pharmaceutical representative. He majored in chemistry at St. Joseph's College in Philadelphia, Penna.

Tire Dealers Form Institute

At a recent meeting of the National Association of Independent Tire Dealers, Inc., held at the Statler Hotel, New York, N. Y., the Tire Retreading Institute was set up to establish production and safety standards for retreaded tires. The institute is being sponsored as a cooperative movement by the dealers association to establish fair business practices among its members, and to work for increased public acceptance of retreading. The group's code of ethics contains rigid regulations covering the use of quality materials and the utilization of skilled workers. It was announced at the meeting that the name of the national association had been changed to the National Tire Dealers and Retreaders Association, Inc.

Rempel Promotes Pfeifenroth

Frank Pfeifenroth has been promoted to vice-president and factory manager in charge of production at Rempel Manufacturing, Inc., Akron, Ohio. Mr. Pfeifenroth was also named a director of the company to replace J. B. Chisnell, retired sales manager. Formerly factory superintendent of the toy firm, Mr. Pfeifenroth has been with Rempel Manufacturing since its founding in 1946. Prior to his employment at Rempel, Mr. Pfeifenroth was a general foreman at the Sun Rubber Co., Barberton, Ohio.

Firth Joins Compo Chemical

Frank E. Firth, widely-known technical engineer and authority on industrial marine products, has been named product development engineer by Compo Chemical Co., Inc., Boston, Mass. Graduated from Harvard University in 1936, he was connected with the U.S. Department of Interior as a technologist and later as research manager of the American Net & Twine Division of the Linen Thread Co. He then acted as product development consultant for such firms as Darworth, Inc., and Woolsey Paint & Color Co. In 1951 he was named Asst. U.S. Commissioner of Scientific, Technical and Economic Mission to the Republic of Indonesia. His work accomplished here, he became Marketing Consultant for Apeldoornse Netten Fabrieken Coy., Holland. He is a Fellow of the American Institute of Chemists, a member of the Harvard Club of Boston, New York Academy of Sciences, the American Wood Preservers Assn., and co-author of "Marine Products of Commerce", published in 1951. His work with Compo will include product development and field research on new industrial products contemplated and already in production at the company plant in Mansfield, Mass. This is in line with Compo's expanded development program for adhesives and coatings requirements in the industrial as well as marine fields.

Anderson-Prichard Conference

Anderson-Prichard Oil Corp., Oklahoma City, Okla., held a general sales and technical conference on solvents on September 18 and 19 at the Congress Hotel in Chicago, Ill. The meeting was called by C. H. Dresser, vice-president in charge of industrial sales. In attendance were distributors, division and department managers, sales engineers and technical representatives from the various sales areas served by the company, as well as members of the research and development staffs. Roland V. Rodman, president, addressed the group on company operations. Available solvents and properties, and new applications and methods of evaluation were examined. A panel discussion on the use of depolarized solvents in dry cleaning was conducted. A round table discussion followed. Technical sales clinic discussion was led by J. Loeffler, president of the Commercial Petroleum Co., and Dr. C. C. Allen, C. A. Gault, C. A. Cotter, Jr., and D. D. Rubek, all of Anderson-Prichard.

Uses Non-Returnable Reels

The Anaconda Wire and Cable Co. has adopted a program of making shipments of certain types of wire and cable on non-returnable reels. Initially, the program will be more or less confined to shipments of building wire items to distributors' stocks and to aluminum insulated and covered conductors. The company stated that the types of non-returnable reels used have withstood commercial shipments to all sections of the United States over the past year and they have proven adequate on all occasions.

Polyisobutylene Dispersion 108

Miller-Stephenson Chemical Co., Inc., 550 Fifth Ave., New York 36, N. Y., has announced the development of "Polyisobutylene Dispersion 108", a stable, aqueous dispersion of "Vistanex". The product is unloaded and is said to yield a colorless, tacky film when the moisture is removed. The dispersion is compatible with natural and synthetic latices, the company states. A milky white liquid in appearance, the product has 55% solids, plus or minus 1.5%; a pH of 10 to 11; a specific gravity of approximately 0.97, and a medium viscosity. Films formed from this unloaded dispersion are colorless and retain flexibility at low temperatures. These films are also highly resistant to acids and alkalis. Dispersion 108 displays good compatibility with fibrous materials and fillers. Dilution of the product may be accomplished by gradually adding soft water to the dispersion under continuous agitation. Suggested uses include pressure-sensitive adhesives, tackifiers and binders, protective coatings, sealing compounds, additive for latex compounding, etc.

Quebec Rubber Group Meets

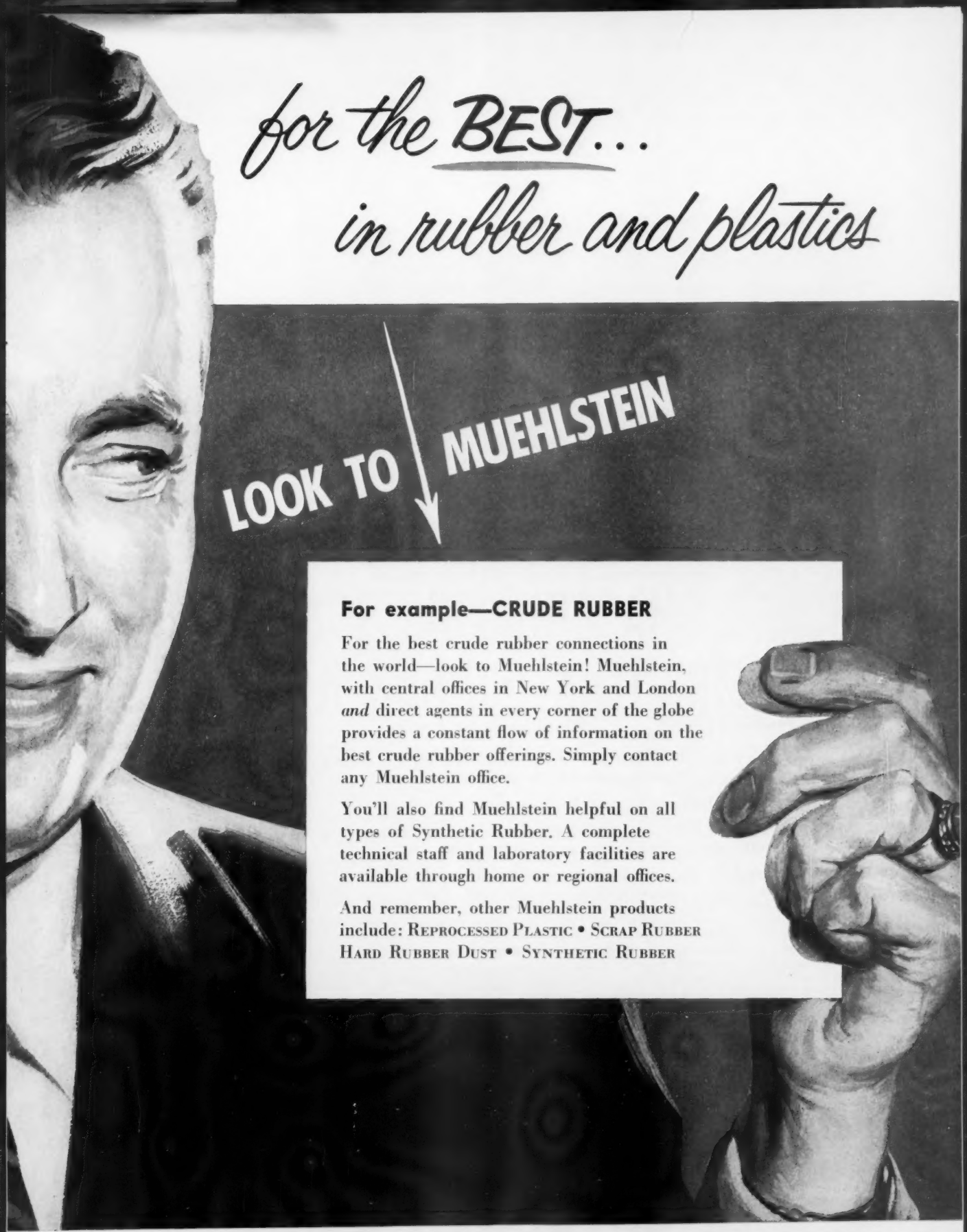
Approximately 80 members and guests of the Quebec Rubber and Plastics Group attended the October 20th meeting held at the Queen's Hotel in Montreal, Que., Canada. Principal speaker at the meeting was Dr. A. J. Kirshner, who spoke on "Effective Reading as an Aid to Better Communication". The speaker deplored the state of neglect into which reading habits have fallen and spoke of the manner in which this situation can be improved. The meeting also featured a dinner and a brief business meeting. Membership in the Quebec Group currently stands at 120.

Predicts Foam Rubber Growth

With foam rubber catapulting toward a $200,000,000 a year national market, Dayton Rubber Co., Dayton, Ohio, expects to have expanded facilities to help meet the demand in operation by January, A. L. Freedlander, president, said recently. In a talk before 100 leading business executives of the Waynesville, N. C., area, he estimated latex used for foam rubber in 1955 will total some 228,000,000 pounds, about 25% more than in 1954. Only eight years ago, consumption in this field was 25,000,000 pounds. Mr. Freedlander predicted that with the development of so many new uses for foam rubber, this market will continue to increase. At one time limited to mattresses, the market has now expanded into the great automotive field and has deeply penetrated the furniture, carpet, aircraft and textile industries. Demands for these foam rubber products have resulted in such a backlog of orders that it is necessary to expand production facilities.

Trenton Plastics Labs Formed

A new firm, the Trenton Plastics Laboratories, 1640 East State St., Trenton, N. J. has been formed to produce custom formulated epoxy and modified epoxy resin compounds to serve the electrical industry. The new company states that these epoxy systems have excellent physical, electrical and chemical properties and are being used extensively for potting, encapsulating, impregnating and casting applications of many electrical components. The Trenton Plastics Laboratories are producing a complete line of industrial adhesives, caulking and coating compounds for marine uses, in addition to repair units of resin and Fiberglas for boats, automobiles and other simple applications.



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U.S. Rubber Lists Flood Damage

Damage to New England plants of the U. S. Rubber Co. during the recent flood is only a fraction of the damage caused by the flash flood of August 19, H. E. Humphreys Jr., president, said on October 17. It is not expected to exceed $1,000,000. "Although production in the footwear and chemical plants located in Naugatuck, Conn., has stopped, we are continuing shipments of finished products to customers," Mr. Humphreys said. "This time we had warning and were able to move much valuable machinery and equipment out of danger areas. There has been no loss of either raw material or finished goods inventories. The footwear plant in Naugatuck is without power because feed lines in the basement are under water. With flood water receding, it is expected that power will be restored on October 17. Clean-up operations are in progress and we hope to have our people back to work within 24 to 48 hours.

"Our Naugatuck Chemical plant expects to start chemical production on October 18 and will be back in full production by the end of the week, with possibly one or two minor exceptions. Reclaimed rubber production will start within two or three days and will be normal by October 28. Synthetic rubber production will start within two or three days and will be back to normal by the end of October. There is a big clean-up job to be done, but it does not reach the proportions of the last flood. The footwear plant in Woonsocket, R. I., is in full production, so is our tire plant in Chicopee Falls, Mass. Damage in these plants was very slight."

Appoints Two Atomic Scientists

Two of the country's leading atomic scientists, Dr. Glenn T. Seaborg, Nobel prize winner and co-discoverer of Plutonium, and Dr. James W. Cobble, formerly of Oak Ridge National Laboratory and the Radiation Laboratory of the University of California, have been engaged as consultants on atomic energy, the U. S. Rubber Co., New York, N. Y., has announced. Dr. Seaborg is professor of chemistry at the University of California, and Dr. Cobble is assistant professor of chemistry at Purdue University and director of the university's heavy element project.

The company also announced it will install a 2-million volt electron accelerator, to aid in atomic research, at its new research center in Preakness, N. J. The center, now under construction, will be completed in 1956. The accelerator, known as a Van de Graaff accelerator, will be built for the company by High Voltage Engineering Corp. of Cambridge, Mass. Recently the rubber company joined with seven other industrial firms in a project to build and operate private industry's first nuclear research reactor.

Development of a new synthetic resin flocculating agent called "Good-rite K-720," has been announced by Goodrich Chemical. The material serves to collect small solid particles into larger clusters.

Completes 25 Years' Service

James F. Hand, manager of rubber chemical sales for the Organic Chemicals Division of the Monsanto Chemical Co., recently completed 25 years' service with the company. Mr. Hand's entire career with Monsanto has been spent in the company's Rubber Chemicals Department at Akron, Ohio, providing technical and sales service to the rubber industry. In the accompanying photograph, Mr. Hand (left) is shown receiving a gold

wrist watch from John L. Hammer, Jr., director of marketing for the division. The wrist watch was awarded in special ceremonies marking Mr. Hand's completion of 25 years' service. Born in Cincinnati, Ohio, Mr. Hand received a B.S. degree in chemistry from Cornell University in 1927 and joined Monsanto's rubber service laboratories at Akron in October, 1930. By 1941, he had risen to assistant general manager of sales for the company's Rubber Service Department. When that department was integrated into the company's Organic Chemicals Division in 1951, Mr. Hand was appointed to his present position.

Didecyl Adipate Now Available

"Flexol" plasticizer 10-A (didecyl adipate) is now available in tank car quantities from the Carbide and Carbon Chemicals Co., New York, N. Y. Decyl alcohols used in the production of this new plasticizer are produced in Carbide's new Oxo unit at Texas City, Texas. Reduced volatility and improved resistance to water extraction are the outstanding features of 10-A, along with its ability to impart excellent low-temperature flexibility and light stability to vinyls. Plastisols prepared with 10-A have superior viscosity stability, the company states. Uses for 10-A include calendered film and sheeting, profile extrusions, dip coatings, slush moldings, and electrical insulation. It is also useful as a plasticizer for nitrocellulose, and a softener for synthetic rubber and natural rubber.

Wellco-Ro-Search Expanding

Wellco-Ro-Search of Waynesville, N. C. has recently enlarged its machine shop facilities to double its former capacity in order to handle the influx of orders for vulcanized footwear equipment from foreign countries. Wellco-Ro-Search provides a continuous flow of technical "know-how" information to those firms that purchase the equipment. This information service covers all phases of manufacturing techniques plus information regarding styling, selling, advertising and general business procedures.

Appoints New Sales Representative

The Pigment Division of The Eagle-Picher Co., Cincinnati, Ohio, has announced the appointment of the Akron Chemical Co., of Akron, Ohio, as its technical and sales representative for zinc oxide to the rubber industry in Ohio, Indiana, Michigan, Western New York and Western Pennsylvania. The Akron Chemical Co. was formally incorporated in January, 1930. Headed by the company's founder and present president, J. R. Silver, Jr., the organization has shown consistent growth over the years. Long experienced in the chemical industry are Akron Chemical Company's two vice-presidents, V. K. Hitch and Dr. H. M. Whitacre. Other company officials include R. L. Silver, R. B. Silver and R. W. Wedd. Today, the company's offices, warehouse and laboratory facilities are located at 255 Fountain St. in Akron. A staff of technical sales representatives, well experienced in the needs of the rubber industry, provides the link between customer and company.

Zinc oxide is one of the principal products of the Pigment Division of The Eagle-Picher Co. Other pigments produced by this manufacturer are litharge, red lead and white lead which are also used in the rubber and plastics industries. As a pigment producer, Eagle-Picher is unique in that its production scope covers operations from mine to finished product. The Pigment Division of Eagle-Picher has manufacturing plants in Galena, Kans., Hillsboro, Ill., Joplin, Mo., and in Newark, N. J.

Dunlop to Make Synthetic Rubber

Dunlop Rubber Co., London, England, has started construction on a plant to manufacture synthetic rubber. The plant will cost about $4,300,000 and will be mainly for experimental purposes. It is expected to turn out an initial output of 2,000 tons of synthetic rubber annually. The company is also exploring the possibility of producing synthetic foam rubber. Foam rubber made from natural raw rubber is now used in many of the company's manufactured products. Another new material being developed is "Fortrez," in which the lightness and strength of synthetic resin is reinforced with glass. It is claimed this material will have a wide range of applications.

G-E Butyl Compound Insulation

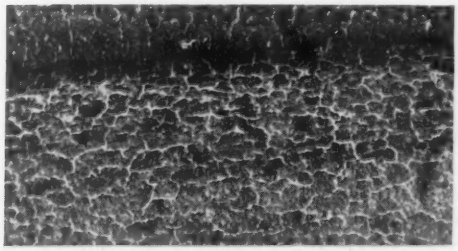
General Electric Co. has announced the development of a new Butyl compound insulation that the company claims is superior to porcelain under conditions of severe electrical discharges. The new insulation promises to have a broad range of applications in the electrical industry, according to company officials. Its first use, however, will be in high voltage instrument transformers replacing porcelain insulators. The new insulation will do away with the need for gaskets, porcelain bushings, steel casings and insulating oil used in the construction of high voltage instrument transformers, G-E states. The new Butyl insulation compound is called "Hy-Bute/60".

No sign of checking. The rubber insulation on this wire contains Sunoco Anti-Chek. Compare it with the sample at the right.

Surface checking is clearly evident in the rubber covering of this wire—which does not contain Sunoco Anti-Chek.

STOP SURFACE CHECKING AND CRACKING WITH SUNOCO ANTI-CHEK

Sunoco Anti-Chek keeps black sidewalls smooth... even after prolonged storage.



Notice the cracking and checking of the sidewall on this tire which does not contain Sunoco Anti-Chek.

Sunoco Anti-Chek is unique . . . there's no other anti-checking wax like it. It's a narrow-cut primary product, not a blend. It is completely controlled from crude oil to finished product by the same company that originally developed it. And it is made in the most flexible wax plant in the world. To you this means a completely uniform product that can be depended on for the same excellent results tomorrow, next year, 10 years from now!

Detailed information on the many advantages of Sunoco Anti-Chek is given in a new technical bulletin. To get a copy, call your Sun Oil Company representative or write Dept. RA-11.

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Silent-Running Snow Tire

What is said to be the first tubeless silent-running snow and ice tire has been introduced by the Firestone Tire & Rubber Co., Akron, Ohio. The company states that the unique tread of its new tire virtually eliminates tire whine common to most other winter tires. The new "Town and Country" tubeless tire is also available with either black or white sidewalls and with nylon or rayon cord. Because the tire is tubeless, it provides greater protection against punctures and blowouts than do tires with tubes. Elimination of the inner tube also results in a lighter weight tire and wheel assembly to give more comfortable ride and longer tire mileage. The new tire is reported to have a long-wearing, non-skid tread with excellent gripping action in loose and hard-packed snow, on ice and in mud. Hundreds of cross grooves in the tread ribs provide added flexibility and closer contact to the road surface, assuring maximum traction for safe stops and starts. The special tread design also has hundreds of angular edges that resist side skidding and assures stops without swerves or skids. A continuous tread design formed by the interlocking tread bars gives the Town and Country a quietness and smoothness of operation and eliminates the vibration, rumble, and whine common in some winter tires. The wide, flat tread also provides longer mileage than other winter-type tires, the company states. A rubber curb guard protects the white sidewalls of the Town and Country.

Phillips Increases Staff

Phillips Chemical Co., Akron, Ohio, has announced the appointment of W. C. Douce, J. T. Roach, R. G. Askew and C. R. Scott as district managers for Plastics Sales Division offices to be established next spring in New York, Chicago, Los Angeles and Boston. W. R. Barrett and G. F. Blinzler will become sales engineers for the Boston and Chicago district offices. M. W. Davidson has been named supervisor of the sales service and development branch of the Plastic Sales Division's Bartlesville, Okla., office, and L. B. Croley, J. V. Smith and A. L. Walters will become sales service engineers in that branch. Previous appointments to staff the plastics sales division were George Wash, director and sales manager; Walter R. Clark, assistant sales manager; R. Vernon Jones, manager, technical service and development; and R. M. Wallace, administrative assistant and coordinator. A sales service laboratory is now under construction in Bartlesville, and will provide facilities for adapting Phillips new ethylene polymer, "Marlex," to customers' needs. Commercial production of Marlex is scheduled to begin in mid-1956 at the company's Adams Terminal plant site on the Houston Ship Channel near Pasadena, Texas.

A new type of disposable diaper, developed by Blessings, Inc., Cranford, N. J., has a coating of Bakelite polyethylene over soft, absorbent, non-woven fabric and fluffed cellulose pulp to combine both comfort and convenience in diaper usage.

Atom Sub Gets Rubber Ears

A specially developed rubber that permits sound waves to pass through in about the same way sound travels through sea water forms part of the hull of the Navy's new nuclear-powered submarine, the "Seawolf". The rubber panels are of the same material as first used on the "Nautilus", the world's first nuclear-powered undersea craft. Developed by the B. F. Goodrich Co. Industrial Products Division, the panels protect sonar electronic gear, yet permit undistorted passage of sound signals. Use of any other material not sharing the characteristics of sea water causes the sound signal to blank out or become distorted so that a target cannot be accurately located.

Increasing Chemigum Capacity

Goodyear Tire & Rubber Co. has announced a $3,500,000 capacity increase to its "Chemigum" and resin plant in Akron. The increase will double the plant's present capacity for production of nitrile rubbers and latices. The plant, which is part of the Goodyear $100,000,000 expansion program recently announced, will supply the growing demand for Chemigum rubbers and latices used by the paper, textile, paint and rubber industries, said Herman R. Thies, general manager of the Goodyear Chemical Division. Mr. Thies said bids will be invited on the new construction at once and that the project will move ahead rapidly. "We expect to have some of the increased production rolling about the first of 1956 and the entire project completed by August of next year," he added. Besides boosting the production of the company's special synthetic rubber Chemigum, the plant addition will also provide for substantial increases in production of "Plio-Tuf" thermoplastic resins and "Pliolite" resins and latices which are also produced at the Chemigum plant.

Merge Products Lines

United States Gasket Co., Camden, N. J., and the Belmont Packing and Rubber Co., Philadelphia, Penna., have announced a consolidation of their product lines, sales organizations and activities under the merchandising name of U. S. Gasket-Belmont Packing. Harry Stott, who headed sales for United States Gasket, is general sales manager of the new combination. This new major source will offer one of the most complete lines of mechanical packings, gaskets, piping specialties, rotating mechanical seals, and what are said to be the largest stocks of "Teflon" and "Kel-F" available to industry today. It also brings together one of the largest groups of Industrial Distributors for convenience, nearby availability of these combined lines in practically every industrial community, here and abroad.

Two New Emery Products

Two new products, "Emoleins" 2957 and 2958 "Lubricant Esters" are now available on a commercial basis from Emery Industries, Inc., Cincinnati, Ohio. During development they were known as Emery 3057-S and Emery 3058-S. These lubricant esters are diesters of azelaic acid; 2957 the iso-octyl ester and 2958 the di-2-ethylhexyl ester. The merits of these azelate esters for synthetic lubricant application have been clearly established during the past five years, Emery states. High quality, competitively priced, compounded lubricants for military and civilian requirements can be confidently based on these Emolein Esters. The company states that the major advantages of Emoleins 2957 and 2958 are: (1) Outstanding viscosity-temperature relationships; (2) High viscosity indexes; (3) Stable Low-Temperature viscosities; (4) Excellent lubricity; (5) Stability to oxidation and thermal conditions; (6) Low sludging and coking; (7) Excellent additive response; (8) High flash and fire value; low evaporation, and (9) Excellent availability from domestic source materials.

Announces Expansion Program

George H. Cash, managing director of Cabot Carbon, Ltd., has announced an important expansion program currently in progress at the company's works in Stanlow, Ellesmere Port, England. Upon completion of the work in progress, the plant's productive capacity will have been increased to 118,000,000 pounds per year of oil furnace type carbon blacks of the qualities currently in demand in the British Isles and in the export market. Completed in 1950, the original plant of Cabot Carbon, Ltd., having a designated capacity of 17,000,000 pounds per year, was constructed to produce only one grade of carbon black, High Abrasion Furnace Black. Subsequent adaptations and new plant have enabled this company to also produce F.E.F. and I.S.A.F. qualities. With the completion of Cabot's present building program, the complete range of oil type reinforcing carbon blacks for rubber can be produced. This program will be completed by midyear 1956, the company states.

New Goodrich Aircraft Tires

Aircraft tires, said to be the first to meet new U. S. Air Force requirements for service in extremely high temperatures at high speeds under heavy loads, are now being manufactured by the B. F. Goodrich Co., Akron, Ohio. Tested in temperatures as high as 280°F., under peak loads of 19,000 pounds at landing speeds up to 170 miles an hour, the specially-engineered tires passed tests said to be the most exacting ever established for pneumatic tires for USAF aircraft. The company said the tires are designed for future aircraft which are expected to encounter extreme temperatures when they enter the "heat barrier." Earlier this year, Goodrich announced that it had developed tubeless airplane tires capable of making landings and takeoffs at 300 miles an hour under loads of five tons per tire.

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Financial News

U.S. Rubber Co.

Nine Months to September 30: Net profit of $22,290,861, which is equal to $3.47 a share of common stock, compared with $20,084,571, or $3.05 a share of common stock, in the first nine months of the previous year. Net sales in the first nine months of 1955 amounted to $688,775,620, against $587,269,614 in the first nine months of 1954. Before deduction of flood loss, net profit came to $27,381,146, which would have been 36% above last year and 22% above the record high for the nine-month period. The flood loss at the company's New England plants totaled $11,877,760.

Stauffer Chemical Co.

Nine Months to September 30: Net income of $6,475,000, which is equal to $2.75 per share, compared with $4,508,000, or $1.92 per share for the corresponding period of 1954. Net income increased 44% over the net income reported during the corresponding period last year. Net sales in the first nine months of the current year amounted to $79,704,000, against $64,174,000 in the first nine months of the preceding year.

American Cyanamid Co.

Nine Months to September 30: Net income of $27,254,000, which is equal to $2.89 per common share after deducting dividends on preferred stock, compared with $20,697,000, or $2.29 per common share in the preceding nine months period after preferred stock deduction. Net sales of the company and its wholly-owned subsidiaries totaled $336,268,000, compared with $293,326,000 in the first nine months of the preceding year.

Flintkote Company

January 1 to October 8: Net income of $3,961,528, which is equal to $2.86 a common share, contrasted with $3,822,208, or $2.83 a common share, in the same period ended October 8, 1954. Net sales in the first thirty-seven weeks of the current fiscal year amounted to $79,620,610, against $74,322,939 in the first thirty-seven weeks of the preceding year.

U.S. Rubber Reclaiming Co.

Nine Months to September 30: Net income of $270,967 in the first nine months of 1955, compared with a net loss of $161,052 in the corresponding period of the previous year.

Swan Rubber Co.

Year to July 31: Net income of $1,154,742, which is equal to $1.80 a share of common stock, compared with $765,314, or $1.19 a share, in the preceding fiscal year.

General Cable Corp.

Nine Months to September 30: Net profit of $4,202,434, which is equal to $1.76 a share of common stock, compared with $3,562,925, or $1.58 a share, in the nine months ended September 30, 1954. Sales in the first nine months of 1955 totaled $12,884,288, against $11,740,318 in the first nine months of the preceding year.

Diamond Alkali Co.

Nine Months to September 30: Net income of $6,255,846, which is equal to $2.58 per common share, compared with $4,477,861, or $1.80 per common share. Net sales for the nine-month period ended September 30, 1955 totaled $82,888,247, an increase of 17% compared with $70,988,638 in the first nine months of the preceding year.

Belden Manufacturing Co.

Nine Months to September 30: Net income of $960,470, which is equal to $2.49 a share, compared with $679,122, or $1.76 a share in the first nine months of 1954. Net sales in the nine months ended September 30, 1955 amounted to $19,951,137, against $16,111,340 in the comparable period of the preceding year.

Hewitt-Robins Inc.

Nine Months to September 30: Net income of $818,192, which is equal to $2.55 a share, compared with $636,361, or $2.10 a share, in the corresponding period of 1954. Net sales for the first nine months of 1955 amounted to $32,871,772 compared with $26,410,944 in the nine month period of 1954.

Thermoid Company

Nine Months to September 30: Net income of $1,085,938, which is equal to $1.25 a share, compared with $614,983, or 66c a share for the first nine months of 1954. Sales for the nine month period totaled $28,333,957, compared with $24,286,172 in the corresponding period of the previous year.

Electric Hose and Rubber Co.

Year to August 31: Net income of $1,075,761, which is equal to $3.73 per common share, compared with $449,085, or $1.56 per share for the corresponding period August 31, 1954. Net sales in the year ended August 31, 1955, amounted to $16,189,655, against $12,382,755 in the preceding year.

Boston Woven Hose & Rubber Co.

Year Ended August 31: Net income of $287,242, which is equal to 71c a common share, compared with a net loss of $432,005 for the prior year. Net sales of $16,326,608 represented a 7% increase over the $15,259,855 reported in fiscal 1954.

St. Joseph Lead Co.

Nine Months to September 30: Net income of $9,142,890, which is equal to $3.37 a share, compared with $4,967,003, or $1.83 a share, in the first nine months ended September 30, 1954. Net sales in the first nine months of 1955 amounted to $90,724,687, against $65,019,154 in the first nine months of the previous year.

Sheller Manufacturing Corp.

Nine months to September 30: Net income of $2,679,546, which is equal to $2.81 a share, compared with $2,058,630, or $2.16 a share, in the first nine months of the previous year. Net sales in the first nine months of 1955 amounted to $39,191,504, against $26,349,468 in the nine months ended September 30, 1954.

National Automotive Fibres Co.

Nine months to September 30: Net profit of $1,576,886, which is equal to $1.60 a share, compared with a net loss of $326,141 in the first nine months of the previous year. Net sales in the first nine months of 1955 amounted to $60,405,279, against $41,612,031 in the nine months ended September 30, 1954.

Aetna-Standard Engineering Co.

Year Ended June 30: Net income of $1,037,790, which is equal to $2.58 per common share, compared with a net income of $1,229,852, in the preceding fiscal year. Net sales in the year ended June 30, 1955 amounted to $20,653,345, contrasted with $26,646,298, as of June 30, 1954.

Johns-Manville Corp.

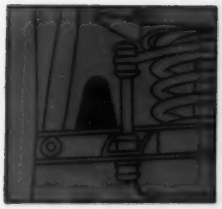
Nine Months to September 30: Net income of $16,441,242, which is equal to $5.16 a common share, compared with $12,711,589, or $4.00 a share in the first nine months of 1954. Net sales in the first nine months of 1955 totaled $207,892,376, against $184,612,937 in the first nine months of 1954.

Firm Adds New Products Line

Lea Fabrics Inc., Newark, N. J., has announced the addition of a new foam rubber products line to its list of goods. The new products include white latex fine foam for brassieres, foam-backed paper and terry cloth fatigue mats, latex foam fabrics for shoe uppers and insoles, upholstery fabrics and foam rubber cushions and seat pads for stadium use. In line with its foam rubber operations, the company has installed new foam rubber working equipment in its Newark plant and is carrying on research and development in the field of polyurethane foam. The new fatigue mat is a foam-backed surface-woven paper fabric produced in a variety of colors. It was designed for housewives to stand on to reduce fatigue while doing housework. The company is continuing to supply floor covering for the automotive industry and has recently developed a heat-sensitive latex foam to be used as backing for automobile upholstery.

In over 100 places, Enjay Butyl rubber parts

add to Pontiac performance



Axle bumper

Body seals, gaskets, insulators, pads, grommets, etc.

Brake and accelerator pedal pads, bellows

Radiator and heater hoses, ducts

Gearshift lever cover

Pontiac has been using parts made of Enjay Butyl since 1946. The great '56 model now incorporates more than 100 parts made from this super-durable rubber, adding to its performance, style and value. These parts have amazing resistance to deterioration and will easily last the life of the car.

Among the many advantages of Enjay Butyl are *price* and *ready availability*. And it is now available in non-staining grades for white and light-colored parts. Extensive laboratory and testing facilities are at your service. For the full story, contact the Enjay Company today.

ENJAY BUTYL

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35 SUCCESSFUL YEARS OF LEADERSHIP IN SERVING INDUSTRY

News in Brief

Sun Oil Co., Philadelphia 3, Penna., has issued a new technical bulletin on "Sun 844X" Grease showing the life of the grease at various operating temperatures. Ask for Bulletin No. 40.

Chase Chemical Corp., 3527 Smallman St., Pittsburgh 1, Penna., has released a four page folder describing "Nafil" expansible polyisocyanate resin for making polyurethane foam.

A new bulletin describing the use of "Polyethylene Glycol 400 Monolaurate" for defoaming, leveling, pigment and color dispersion may be obtained from Glyco Products Co., Inc., Empire States Bldg., New York 1, N. Y.

Adipic acid is the subject of Technical Bulletin I-12 released by National Aniline Division, Allied Chemical and Dye Corp., 40 Rector St., New York 6, N. Y. The bulletin includes suggested uses for this chemical and a list of 45 literature references.

Adhesive Products Corp., 1660 Boone Ave., New York 60, N. Y., has announced the development of a protective coating for greenhouses called "Apco Aluminum Neoprene Paint."

Pittsburgh Consolidation Coal Co., Pittsburgh, Penna., has purchased the Newark, N. J. plant of the Reilly Tar and Chemical Co., and is establishing a modern cresylic acid plant. A new subsidiary, Pitt-Consol Chemical Co. will operate the refinery.

"Geon" vinyl plastic is used in baseball bases filled with sponge rubber. Sold by baseball equipment supplier, Jack Corbett, Van Nuys, Calif., the vinyl plastic bases are now used by four major league clubs and a number of minor league clubs.

The Bee Chemical Co., Chicago, Ill., has taken over the sales of vinyl extrusion and injection molding compounds, manufactured by the Premier Thermo-Plastics Co., Jeffersontown, Ky.

Rigid "Geon" vinyl plastic is used in wiring duct sold by the Taylor Electric, Inc., Detroit, Mich. The wiring duct enables control panel manufacturers to speed up production rates by eliminating old-fashioned wiring methods.

Industrial Rayon Corp., Cleveland, Ohio, has announced plans for the construction of an 80,000 square foot, one-story plant to accommodate the operations of the company's Central Engineering Shops.

Twenty-four tubeless tires standing seven feet, four inches tall, manufactured by Firestone Tire and Rubber Co., carry the weight of the world's longest trackless train just built for freight hauling in Alaska.

Four Palco industrial fibers produced from redwood and redwood bark are described in a new bulletin just released by Pacific Lumber Co., 100 Bush St., San Francisco 4, Calif. Samples will be furnished upon request. Ask for Bulletin No. F-130-1.

A new data sheet on its line of fittings for tank, fuel oil and butane-propane hose has just been issued by B. F. Goodrich Co., Industrial Products Division, Akron, Ohio.

American Wheelabrator and Equipment Corp., Mishawaka, Indiana, has announced that it has changed its corporate name to Wheelabrator Corporation, effective immediately.

A major price reduction of four and three-quarters cents per pound for tank-car quantities of methyl and ethyl acrylate monomers, has been announced by Rohm and Haas Co., Philadelphia, Pa.

Soft, resilient rubber cushions, developed by B. F. Goodrich Industrial Products Division, will support the four 75,000 pound propellers and massive propeller shafts of the Navy's newest super aircraft carrier, "Saratoga."

A new greenhouse watering system, developed by Greco's Greenhouses, Middletown, Conn., uses black polyethylene tubing to stop penetration of light, thereby preventing growth of algae and assuring a free flow of water through the small holes.

A new booklet on "Aero Cyanuric Chloride," published by the Industrial Chemicals Division, American Cyanamid Co., New York, N. Y., contains the latest data available on this product and discusses its properties and current applications in such fields as rubber chemicals, plastics and resins.

Blasts of cold wind, snow, rain, dust and dirt can now be kept out of home or garage by the use of new Do-It-Yourself "Cushion Seal" Geon vinyl plastic weatherstripping kits manufactured by the Kessler Products Co., Youngstown, Ohio.

Columbia-Southern Chemical Corp., Pittsburgh, Penna., has issued a bulletin on the "Comparison of Fine Particle Size Silica Pigments, Hi-Sils 101, 202 and 233."

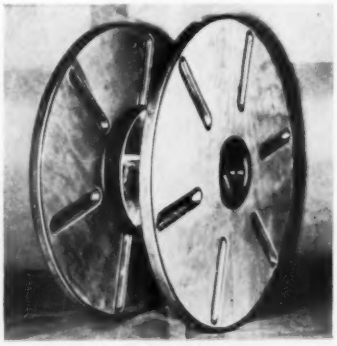
Diamond Alkali Co., Cleveland, Ohio, has made available a compilation of Diamond publications entitled "Your Handy Checklist of Helpful Diamond Literature." Available on request.

Claremont Pigment Dispersion Corp., Brooklyn, N. Y., has issued Technical Bulletin No. 175 as a guide to the vinyl chemist in the selection of colors.

National-Standard Wire Package

A palletized reel-less wire coil package which is said to sharply reduce incoming freight charges on shipments of bead wire and eliminates all return shipping charges has been developed by the National-Standard Co., Niles, Mich. To handle the package at the customer's plant, National Standard also has designed a let-off reel (shown herewith) which is maintained at the point of use. Heretofore, bead wire has been shipped across the country on large steel reels weighing about 100 pounds each. The tire plant paid for both the incoming freight on these reels and for their return to the supplier—a price over and above the actual cost of the wire. The palletized package accomplishes these savings in freight which are passed directly on to the customer because: (1) It is considerably lighter in weight than the conventional steel reel, and (2) It does not have to be returned to the supplier.

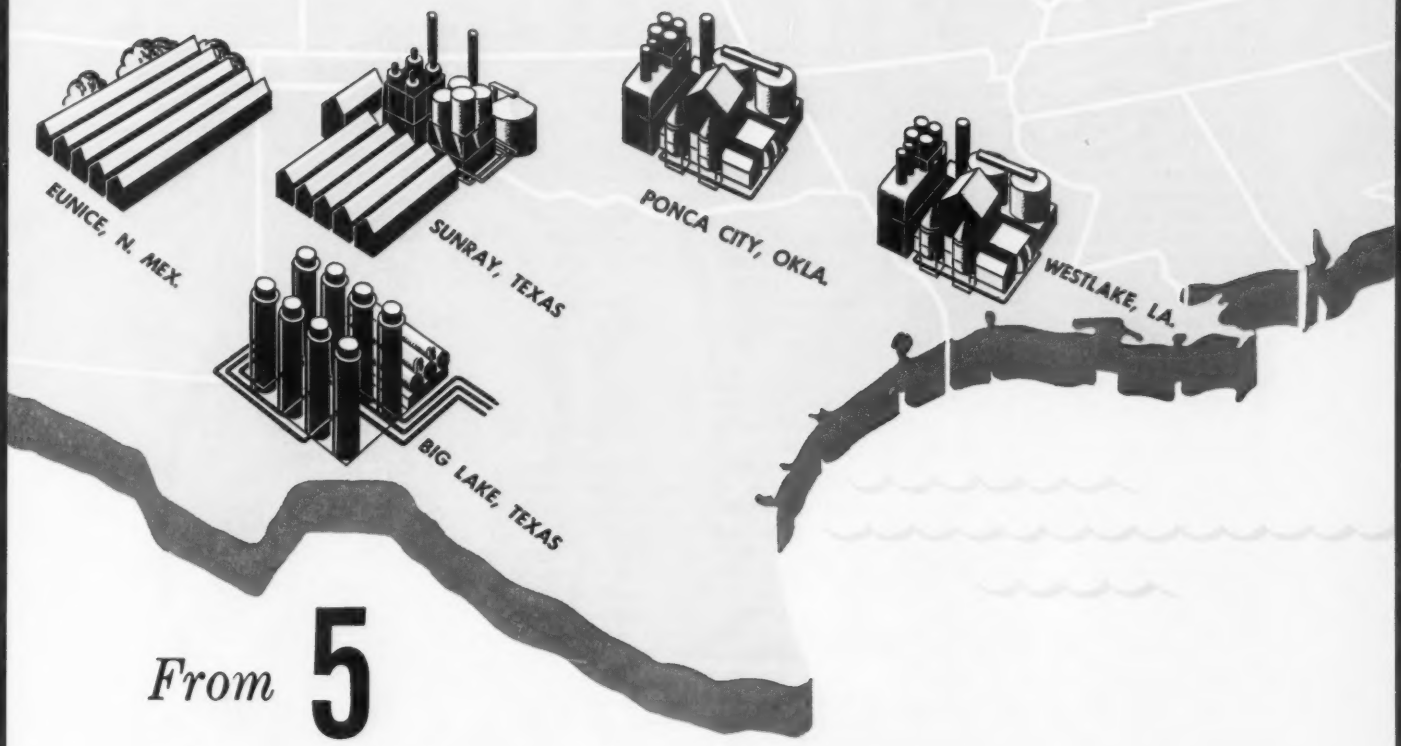
A wooden, non-returnable pallet, 48 inches across the front and 24 inches deep, is firmly attached to the package which contains four bundles of wire. Paper



wrapped, each bundle is stacked side by side and two high. The package, weighing about 2,600 pounds net, with 54 pounds tare, contrasts markedly to almost 400 pounds tare for its equivalent in steel reels.

In preparation for shipment, the wire first is wound on a collapsible reinforced plywood reel which has a cardboard core. The flanges, or rims, are constructed with slots to allow for strapping the wire, completely free of the reel itself. In this strapping, the cardboard core becomes an integral part of the wire coil. After the wire bundle is strapped with six steel bands and the flanges are removed, it is spiral-wrapped with a kraft paper and strapped along with three other coils to the non-returnable pallet.

At the customer's plant, the palletized package can be unloaded and stored with one-half to two-thirds less man hours than required to handle the same amount of wire on steel reels. With a powered forklift truck, one man can do this job. The pallet is so designed that it can be handled from the end or side, permitting easy access to backrow storage. This makes it possible for the customer to rotate his inventory, which eliminates a problem posed by the steel reel. Furthermore, up to three times the wire can be stored in a given area by stacking the pallets two or three high, depending on floor load capacity.



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Los Angeles News

E. J. Thomas, president of the Goodyear Tire & Rubber Co., was featured speaker at the Southern California Industrial Development Conference which was held on October 4 at the Ambassador Hotel in Los Angeles, Calif. In addressing the group, Mr. Thomas revealed that Goodyear will build a $7,500,000 addition to its Los Angeles plant during 1956.

The new building will be 460 by 150 feet and will house the latest in rubber curing equipment. Present plans call for a two-story structure containing 138,000 square feet. The new building will adjoin the south end of the present plant which was built in 1920.

During the conference, Goodyear was saluted as the first major eastern industry to establish a Southern California plant. The conference featured day-long sessions with key speakers from the nation's basic industries.

Howard Fisher, formerly assistant chief chemist of the W. J. Voit Rubber Corp., has been promoted to chief chemist of the Sporting Goods Division of the company. It was also announced that Ford Price, formerly chief chemist, has been elevated to chief development compounder. As chief chemist, Mr. Fisher will be in charge of product quality standards and allied manufacturing activities which require chemical supervision. Holder of A. B. and M. A. degrees from the University of Arizona, Mr. Fisher has been with Voit for one year. Mr. Price, who has been with the company for four years, will be concerned primarily with the development of new products and improvement in existing items. Mr. Price holds a B. S. degree from the University of Illinois.

Construction of a new 20,000 square foot warehouse and shipping building for the American Latex Products Corp. of Hawthorne, Calif., was recently completed as an additional step in the 1955-56 facilities expansion program of the company. Of brick and wood truss construction, the new building is located adjacent to the company's present plant in Hawthorne. The $90,000 addition will bring total plant floor space to 85,000 square feet.

Pennsylvania Industrial Chemical Corp. of Clairton, Penna., has announced the opening of a new West Coast district office in Los Angeles. The new office will serve as both a sales and technical development center for the entire western United States. Arthur Patureau has been named West Coast manager in charge of the new office.

The November 1 meeting of the Los Angeles Rubber Group, scheduled to be held at the Statler Hotel in Los Angeles, was to have been addressed by Harold Gray, technical director of the B. F. Goodrich Co. Tire and Equipment Division, and R. P. Wescott of the Los Angeles district office of the Bakelite Co. Mr. Gray was to have spoken on "The Tubeless Tire—Past, Present and Future", while Mr. Wescott's talk was to have dealt with the elastomeric and non-rigid thermoplastic resins—fluorothene, polyethylene, and the vinyls. A full report on the meeting will appear in a future issue of RUBBER AGE.

On October 6th the Natural Rubber Bureau of Washington, D. C., sponsored a luncheon at the Jonathan Club in Los Angeles for Dr. George Martin, superintendent for the London Advisory Committee for Rubber Research (Ceylon and Malaya). Dr. Martin, a Colwyn Gold Medalist, has been visiting the United States on behalf of the British Rubber Development Board and the British Rubber Producers' Research Association. Dr. Martin visited several rubber plants in the Los Angeles area and was a guest of Dr. Harry L. Fisher at the Tlargi Laboratory and an evening class.

At the luncheon, Dr. Martin described some technical developments in natural rubber and explained recent studies by the natural rubber industry aimed toward establishing a technical service to American consumers that would be of practical and direct benefit. In a discussion period which followed, a wide variety of problems, needs and objectives of any natural rubber technical service were reviewed.

John Sekonda has been named superintendent of the National Foam Rubber Corp., Montebello, Calif.

Russell L. Nagel has been named superintendent of the Miller Rubber Products Co., Los Angeles.

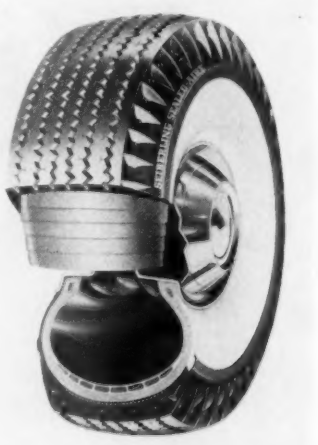
California Rubber Products, Hawthorne, Calif., has announced the appointment of Tom Sloan as sales manager. C. E. Schmerhorn has been named production manager and Howard Keefer has assumed responsibility for rubber plant factory management.

Introduces Plastolein 9404 TGP

"Plastolein 9404 TGP" (triethylene glycol dipelargonate) is now available on a commercial basis, according to Emery Industries, Inc., Cincinnati, Ohio. Known as Emery X-66-S while in the development stages, this plasticizer has proved to be an exceptional value in the plasticization of synthetic rubbers, the company states. Primarily a low-temperature plasticizer, 9404 also imparts other characteristics that make it an economical replacement for plasticizers now in use. For example, as compared to other triglycol esters and the adipates, Plastolein 9404 TGP gives lower heat loss, less water sensitivity, lower compression set in addition to equivalent low temperature flexibility.

Sealed-Aire Tubeless Tire

A new type of tubeless tire that seals punctures and is said to stay permanently in balance has been announced by the Seiberling Rubber Co., Akron, Ohio. J. P. Seiberling, company president, said the tire, to be marketed under the trade name "Sealed-Aire," is different from any other, and overcomes shortcomings of present tubeless tires. Like others of the sealant type, the new tire has a layer of soft sealing gum that clings to nails and other puncturing objects. Its special feature is a series of live rubber cells or "bulkheads" lining the tread area to hold the gum in place as shown in the accompanying cutaway view. Mr. Seiberling said these cells prevent the gum from being thrown to the center of the tread by centrifugal force as the tire rolls at high speed, or from flowing to the bottom when it stops. "These were the two



big problems with sealant-type tires," he said. "The gum would bunch up in a narrow strip, or lump up and throw the wheel out of balance. We have licked both problems now."

The company has applied for patents on the principle, which it developed before World War II for a sealant tube. A tube with a double row of bulkheads was used as a bullet-sealing tube by armed forces vehicles and officials' cars during the war, Mr. Seiberling said. The new tire, which is premium priced, is of nylon cord construction, with an extra nylon breaker ply under the tread to give added strength. A special shaped rib-type tread is said to be quieter on the road than previous models, and the tire shoulder has the company's patented "heat vents" to reduce running temperatures.

To demonstrate the tire's sealing qualities, the company subjected it to a series of unusual tests, which were filmed in Florida in August. Steel-tipped arrows, rifle bullets, knives and underwater harpoons were fired at the tire, which also withstood 100-mile-per-hour runs at Daytona Beach, Fla. The company's president said the new tire had been road-tested extensively in Texas, and had been proved with more than a million miles of road service since July 15.

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R55

Canadian News

Three tire manufacturers have urged that a Finance Department Committee recommend that standard and special brands of tires be taxed equally. B. F. Goodrich Canada, Ltd., Goodyear Tire & Rubber Co. of Canada Ltd., and the Firestone Tire & Rubber Co. of Canada, Ltd., made the proposal in a brief to a committee studying the level at which sales taxes should be applied. The brief said a 10% sales tax is collected on their tires based on the cost of manufacture, advertising and distribution. But the tax on special brands—those made specifically for a particular retailer—was collected on the lower price paid by the retailer, which included no charges for advertising and other costs.

The brief urged that the tax be levied at the "pure manufacturer's level"—the actual price charged for the product. This would mean that the taxable value of both standard and special brands would include the same costs. Adoption of such a tax base, the brief said, would mean a reduction in the price of standard brands, and a $1,000,000 annual saving to tire purchasers in Canada.

The three tire companies have appealed to the Supreme Court of Canada against an Exchequer Court decision rejecting their bid to have the sales tax on special brands levied on the price charged by the retailer. They asked the court to declare Eaton's and similar distributors of special brands manufacturers for tax purposes. The tax, in the case of Eaton's, is levied on the selling price of Dominion Tire Co., Eaton's supplier.

J. Ross Belton, president, Gutta Percha & Rubber, Ltd., Toronto, has announced the following appointments: J. W. Hammond, director of purchases; J. E. Vasburgh, export sales manager; C. A. Sellers, merchandise manager, industrial products and J. H. Crane, manufacturing manager. After wide experience in the textile industry, Mr. Hammond joined Gutta Percha in 1942 and was appointed manager of the Supply Department in 1948. Mr. Vosburgh has been connected with the company's export operations since 1947 and in 1954 was appointed assistant manager of the Export Department.

Mr. Sellers joined Gutta Percha in 1935 and served during World War II in the R.C.A.F. He advanced to the position of Supervisor, Sales Control and Sales Planning in 1953. Mr. Crane, a graduate of Royal Military College and McGill University (Chemical Engineering), joined Gutta Percha in 1922, and was promoted superintendent of the mechanical goods factory in 1926.

A new high strength viscose yarn for tire cord has been developed by Courtaulds (Canada) Ltd. The company says it is 25% stronger than the regular high tenacity tire yarn which it has been supplying since 1943. It is called "Tenasco 201." The new development, produced for the first time in Canada, is at present available in reasonable quantities but the company expects to be able to supply the full Canadian demand as changes in its plant are completed.

A $3,500,000 chemical plant will be built by B. F. Goodrich Canada, Ltd., near Niagara Falls, Ont., for the production of Geon polyvinyl plastic materials, it has been announced by J. R. Hoover, president of the B. F. Goodrich Chemical Co. Engineers of Goodrich Chemical will work in cooperation with the technical staff of the Canadian company in the design and construction of the new facilities.

The announcement, made in Canada by Ira G. Needles, president of B. F. Goodrich Canada, Ltd., stated that land for the new plant is between Welland and Niagara Falls, in Thorold Township, and was purchased by the company over a year ago. Construction will start early next year, with completion scheduled for early 1957. The new facilities will be operated as a chemical division of B. F. Goodrich Canada, Ltd., with headquarters in Kitchener.

Although Mr. Needles did not estimate the potential employment at the new location, he pointed out that the chemical plant would be making primary raw materials for use in further production and would not require a large staff. "However, other factories using these plastic raw materials for the manufacture of many varied consumer items provide a constantly expanding employment through a steady growth in the number of products," he added.

A visual teaching unit, outlining the history and uses of rubber and rubber products is being offered free to Canadian schools by the Rubber Association of Canada. The kit, mounted on heavy cardboard, includes test tubes containing samples of chemical and natural rubber and ingredients used in processing, booklets and pictures of various industry operations.

Lee T. Rosser, president of Mansfield Rubber (Canada) Ltd., Barrie, Ont., has announced that his company's new plant is now producing automobile tires. It is expected that the plant will be in full production within a short time. The new plant is said to be one of the most modern tire producing plants on the continent. Mansfield Rubber will produce tires for national marketers under special brand labels.

H. Wolfhard, vice-president and general manager of the Footwear and General Products Division of the Dominion Rubber Co., Ltd., has announced the appointment of J. J. Gilfillan as manager, branch sales.

Appointed Research Director

Michigan Chemical Corp., Saint Louis, Mich., has announced the appointment of Dr. Dwight Williams as director of research. Dr. Williams, who recently resigned as Chief, Biology and Chemical Branch, Quartermaster Research and Development Command, U. S. Army, Natick, Mass., will be located at the company's research and technical laboratories at Saint Louis. With a bachelor of science in chemistry from Ashland College of Ohio, Dr. Williams continued his college work at the University of Michigan where he received a masters' degree in chemistry in 1927. He then served as professor of chemistry at Westminster College in Salt Lake City, Utah for six years, returning to Ann Arbor for his Ph.D. in chemistry, which he received in 1935. In February, 1936, he joined Westvaco Chlor-Alkali Division of the Food Machinery Co. at South Charleston, West Va., as research chemist working on analytical procedures. He later became group leader and then section research director concentrating on exploratory research, laboratory and pilot plant process development, plant design, and start-up techniques on full-scale production units. He left Westvaco after becoming assistant research director. Dr. Williams is a member of the American Chemical Society, the American Institute of Chemical Engineers, the American Association for the Advancement of Science, and the Optical Society of America.

Tire Prices Raised Again

Effective October 24, the Goodyear Tire & Rubber Co., Akron, Ohio, increased its prices on tires, tubes, tread stock, repair materials and recapping. The company said that the increases were made necessary by the increased costs of materials and labor. All conventional passenger tires, farm and implement tires and pneumatic industrial tires were 1½%. Truck tires were increased up to 5%. All inner tubes were increased 3½%. GR-S type tread stock was increased 1c per pound. Natural rubber tread stock was increased 4c per pound. Repair materials were increased 5% and recapping prices were increased 7½%. Similar price rises were announced by the U. S. Rubber Co., New York, N. Y., on October 31 and by the Dayton Rubber Co., Dayton, Ohio, on October 25. It is expected that other major producers will shortly announce similar price increases.

Paint Protects Whitewall Tires

A special protective coating for whitewall tires that assures the customer of clean unmarked sidewalls is now being applied to its entire line of "Blue Ribbon Thorobred" tires made by Dayton Rubber Co., Dayton, Ohio. Prior to being wrapped for shipment, the tires are painted with a light blue, water soluble paint. After the tire and wheel are mounted and balanced the paint comes off with a cold water rinse. This eliminates possible soiling in shipping, as well as when the tire is mounted.

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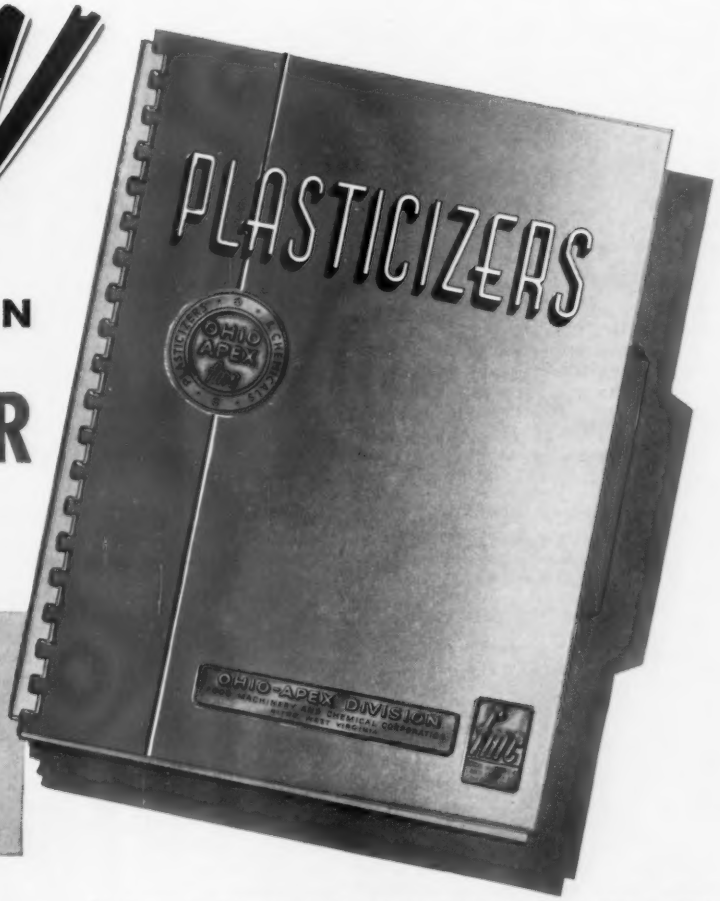

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Obituaries

Sir Arthur Du Cros

Sir Arthur Du Cros, founder of the Dunlop Rubber Co., died on October 30 in Oxney, England. He was eighty-four years old. Sir Arthur, with his father, was a pioneer of the pneumatic tire industry. He used them on his bicycle first in a race at Queen's College, Belfast, sixty-six years ago. As a youth, Sir Arthur entered the civil service but soon joined his father and brothers in the tire industry. He took up motorcycling and became the champion of Ireland and France. In 1908 he entered Parliament as a Unionist and retained his seat until 1922. During World War I he personally recruited a batalion of men for overseas duty, and organized a fleet of motor ambulances for use in France.

Sir Arthur had many business interests during his lifetime. He was president of Covent Garden Properties, Ltd.; director of Foundling Estates, Ltd., and of Joint Industries, Ltd.; chairman of Anglo-Venezuelan Oil Trust and director of San Paulo Improvements Co. He was made baronet in 1916. Sir Arthur frequently contributed to worthy causes and for many years he had parties for East End children at his Craigweil House estate.

Charles L. Fulkert

Charles L. Fulkert, retired vice-president of Stokes Molded Products Division, Electric Storage Battery Co., Trenton, N. J., died on October 10 in Trenton General Hospital, Trenton, N. J. He was 70 years old. Mr. Fulkert, after finishing Stewart Business College, was employed with Joseph Ashton, Inc., industrial suppliers, and the Munger Tire Co. In 1902, he became a bookkeeper for the Joseph Stokes Rubber Co., which was the predecessor of Stokes Molded Products. Mr. Fulkert was named vice-president of the Stokes firm in 1938 and remained in charge of the sales department until 1946 when the firm was sold to the Electric Storage Battery Co. Since then he served as vice-president and director until his retirement last October.

Mr. Fulkert was a charter member of the Carteret Club and also held membership in Loyal Lodge 181, F & AM; Scottish Rite, Crescent Temple, Knights Templar, and the Trenton Country Club. He also served on the board of trustees of the Carolyn Stokes Day Nursery. He is survived by a sister.

Richard P. Hood

Richard Percival Hood, a former executive of the Hood Rubber Co., died October 13 at his home on Shelter Island, N. Y. He was 84 years old. Mr. Hood was a graduate of Harvard University in 1894 and was a member of the Institute of 1770. His father, the former George H. Hood, was founder of the Hood Rubber Co.

Harry E. Keller

Harry E. Keller, former B. F. Goodrich Co. executive died on October 16 at his home in Hendersonville, N. C. He was 71 years old. Mr. Keller was associated with Goodrich for 43 years. At the time of his retirement in 1946, Mr. Keller was general manager of the Goodrich Associated lines tire and accessory sales division, which position he held since 1926. Born in Massillon, Ohio, Mr. Keller was employed as a stenographer in the mechanical goods sales department of Goodrich in 1903. He became assistant mechanical goods sales manager in 1906 and product sales manager in 1907, holding that position until 1920. Named manager of the company's Central Division in 1920 handling sales of both tires and industrial products, Mr. Keller two years later became general sales manager of Diamond tires and industrial products. Mr. Keller was a member of the Masonic Lodge. He is survived by his wife.

SP Rubber Described

In the current issue of "Rubber Developments," publication of the Natural Rubber Bureau, 1631 K St., N. W., Washington 6, D. C., there appears an article describing "Superior Processing Rubber." This newly-developed type of natural rubber is said to possess many advantages over ordinary crepe and sheet in the intermediate stages of converting raw rubber into the manufactured article. It is stated that the new rubber is more easily brought into the necessary smooth condition for preliminary shaping and subsequently retains its shape much better than any other type of rubber. SP rubber particularly lends itself to compounds containing a very high proportion of rubber, where it enables articles to be manufactured of natural rubber, such as thin-walled tubing and high-grade, rubber-covered wire, which previously had to be made from plastics in order to obtain a smooth surface and accurate dimensions. Copies of "Rubber Developments" which contain this article may be obtained without charge from the Natural Rubber Bureau.

Poncet Davis Conviction Upheld

The U. S. Sixth District Court of Appeals at Cincinnati, Ohio, has ruled against Poncet Davis, thus upholding his income tax fraud conviction, five-year prison sentence and $40,000 fine. Mr. Davis indicated his intention to appeal the case to the U. S. Supreme Court. The Federal District Court at Cleveland, Ohio, ruled last year that Mr. Davis was guilty of failing to report taxable income of $857,252 over a period of years. He had been under $20,000 bond while awaiting the appeals decision.

Seminar on Latex Polymers

A technical seminar on synthetic latex polymers was presented to the Northwest paper industry October 21 by the Chemical Division of the Goodyear Tire and Rubber Co., Akron, Ohio. The seminar was held at the Crown-Zellerbach Corporation's new research laboratories at Camas, Wash. Objective in scope, the seminar was considered unique in the presentation of technical material to industry, and more than 100 representatives from some 25 companies in the paper, lumber and paint industries attended the technical meetings.

Talks offered by five Goodyear speakers were illustrated by both black and white and color slides. Development, production, evaluation, properties and uses of synthetic latices were the main topics presented to the technical audience. Principal speaker was Herman R. Thies, general manager of the Goodyear Chemical Division, who opened the session with "The Synthetic Latex Industry," giving a word picture of the scope of this relatively new industry. Dr. J. D. D'Ianni, assistant to the vice-president in charge of research and development at Goodyear, discussed the "Theoretical Consideration of Polymerization and Latex Characteristics." Later in the program, he described "The Course of a Product Development."

"Sources of Materials for Latex Manufacture" was given during the morning session by R. S. Earhart, assistant general sales manager of the Chemical Division. He opened the afternoon session with a pictorial slide story of "The Production of Synthetic Latex" and later described the "Types of Latex Commercially Available."

Two papers were delivered by Willard C. Smith, latex and adhesives section head for the Chemical Materials Development Department. "Properties of Latex Systems and Evaluation Procedures" was offered in the morning, and during the afternoon, Smith discussed "The Influence of Latex Variants on Important Performance Characteristics." Earl W. Scott, sales service representative for the Chemical Division's Coatings department, presented "A Survey of Latex Applications and Potentials" in the various coating fields. Mr. Thies concluded the meetings by presenting a summation of the important technical and educational points presented during the program.

Data on Research Studies

The complete collection of technical papers from the Government Synthetic Rubber Program has been made available to the public for the first time, according to the Office of Technical Services, U. S. Department of Commerce. The 3,750 reports covering the period February 1, 1943, through June 30, 1954, are available only in microfilm or photocopy and may be obtained from the Photoduplication Service, Publication Board Project, of the Library of Congress, Washington 25, D. C. The papers are identified as PB 118310. Microfilmed cards giving title and a brief summary of each of the reports are also available. Prices will be quoted by the library on request.

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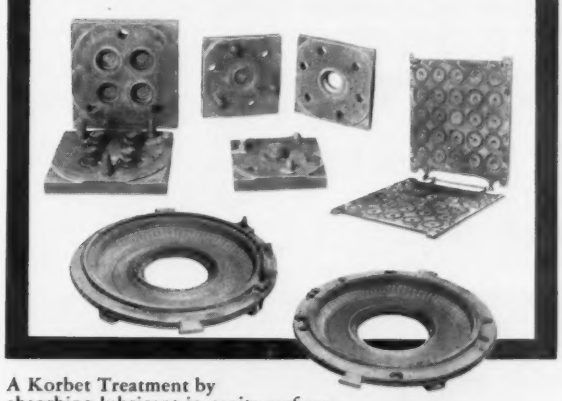

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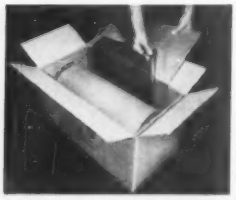

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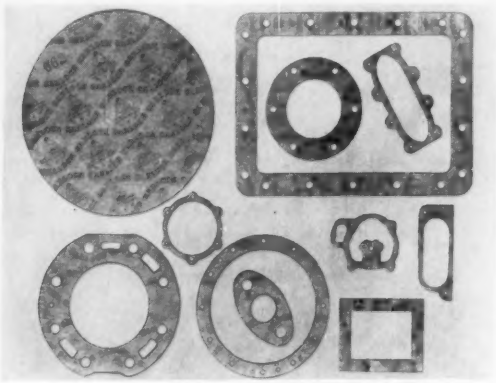
New Goods

Garlock 662 Gasketing Material

A tight sealing gasketing material known as "Garlock 662", developed primarily for use in the oil and chemical processing industries, is now being manufactured by the Garlock Packing Co. of Palmyra, N. Y. Garlock 662 is a cork base paper impregnated with Chemigum Latex. The Chemigum Latex is said to permit the use of the gasketing at temperatures as high



as 300°F., whereas the maximum for ordinary vegetable fibre gasketing is said to be 212°F. The latex binder is not susceptible to changes in moisture content, thus eliminating shrinkage which is a critical problem in ordinary gasketing. Elimination of shrinkage allows users to cut ther own gaskets from Garlock 662 sheet far in advance of actual needs. Garlock 662 sheets or cut gaskets are made in thicknesses from .01 to .25 of an inch. Cut gaskets are available in a variety of shapes and sizes with outside diameters up to 48 inches.

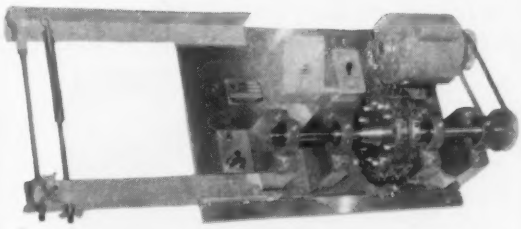
Martin Rubber Horseshoe Set

Martin Rubber Co., Long Branch, N. J., has redesigned its pitching horseshoes set which has been in production for the past fifteen years. The new "J-100

Jr. Pitching Horseshoe Set" now offers engraving on the bright green and red horseshoes. In addition, the set is now packaged in a four-color heavy display box.

B. F. GOODRICH–

DISC COMPRESSION CORD TESTER



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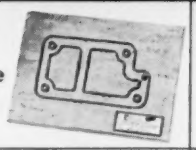
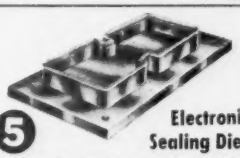
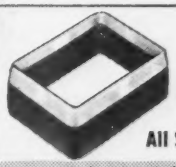


2 Steel Rule Clicker Dies



5 Electronic Sealing Dies



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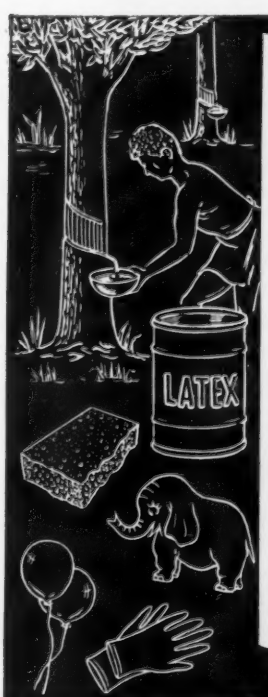

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Polyethylene Trash Can

Loma Plastics, Inc., 3000 West Pafford St., Fort Worth, Texas, has introduced a new type ten-gallon trash can molded of a single, seamless piece of Bakelite polyethylene to prevent leaks, dents or corrosion. Convenient handles, bright new colors and an attractive ribbed design are molded into the large but lightweight container. A tight-fitting lid made of polyethylene fits

snugly over a flange on the rim as shown in the accompanying photograph. The soft-feeling, resilient surface of the polyethylene keeps it from marring or scarring floors, woodwork and furniture. Corrosion that eats through most containers of this type is withstood by the polyethylene which also resists water, soaps, grease, oils and even acids or alkalis. Standing about 20½ inches high and 13¾ inches in diameter at the top, this can is available with red, yellow, white, green, grey, or copper molded-in colors.

Oil-Resistant Belting

A conveyor belt featuring greater resistance to the penetration of vegetable and animal oils and fats has been developed by Hewitt-Robins, Inc., Stamford, Conn. The belt, made with a nitrile rubber cover, is designed for use in food processing plants, feed mills and textile mills. Oils and fats penetrate ordinary belts when carrying such items as doughnuts, peanuts, cotton seed, potato chips, walnuts, fish and fried foods. This causes the cover to swell, crack and break. The nitrile cover will not swell even after long service. In laboratory tests, the nitrile cover was compared with two others in a walnut oil immersion test. After six weeks at room temperature, the nitrile cover had not swollen at all; the second cover showed a 38% swell, while the third showed a 74% swell. The new belt has a light tan cover which is easy to keep clean. It will be made with a smooth top for horizontal haulage and a rough top for inclines and declines.

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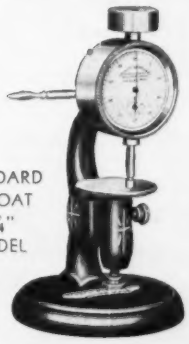

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THROAT DEPTHS
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supplied by Internal Spring or Direct Weights

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⅛" to 1¼"

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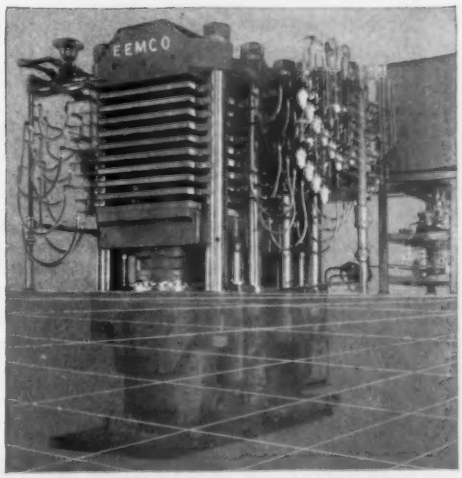

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Spreader knife application of base coat, any time prior to lamination, simplifying production schedules.

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Do-It-Yourself Puppets

Topstone Rubber Toys Co., 77 South St., Bethel, Conn., is now producing a "do-it-yourself" puppet kit designed to stimulate the creative talents of children. Each kit contains a flexible rubber head, two colors of rayon hair, non-toxic, water soluble paints, rubber

adhesive, paint brush, puppet dress, and a full set of instructions. All these items are contained in a specially-designed no-spill package. Working with the materials at hand, a child can create his own puppets. Present company plans include a full line of additional basic rubber heads, each of which can be made up as three or four different characters.

Flexsteel Pile Driver Hose

A new, extremely flexible pile driver hose for the construction industry has been announced by the Goodyear Tire & Rubber Co., Akron, Ohio. Called the "Flexsteel Pile Driver Hose", its high degree of flexibility has been demonstrated in both laboratory and field tests conducted jointly during the past few months, Goodyear states. The improved hose is designed to give longer work life than similar products now on the market. Produced in one and one-half inch, two-inch and two and one-half-inch sizes, the hose is equipped with heat resistant tubes and covers. The tubes are said to have "built-in" resistance to oils as well as heat. The hose is constructed of two braids of high-strength steel wire, with high quality nylon breaker used over the second steel braid to provide better heat resistance and cover adhesion.

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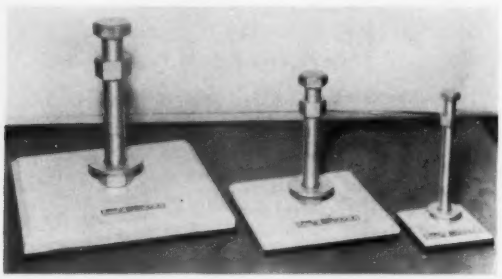
MB Vibration Control Mount

MB Manufacturing Co. ,a division of Textron-American, Inc., 1060 State St., New Haven 11, Conn., has announced the development of a new, double-function leveling mount. Not only does the new mount permit quick and easy leveling without lagging to the floor of machinery of all kinds, but it is also said to reduce the transmission of machine noise, shock and vibration. The new mount consists of a metal plate with an



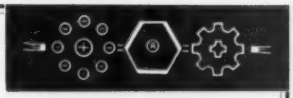
"Isomode Pad" cemented to it, a threaded bolt, flanged leveling nut and lock nut. To install on machinery already in place, the footings are raised high enough to slide the mount under it, the bolt is inserted through foot and the flanged leveling nut is threaded on. When the machine is level, the lock nut is tightened. Shims and lagging to the floor are eliminated, the company states. Because of the characteristics of the Isomode Pad, the machine will not walk or creep. Fabricated from neoprene, the pad is highly resistant to attack by oil, grease and floor washing compounds. The MB Leveling Mount is available in six models of three sizes, 3 by 3 inches; 6 by 6 inches, and 9 by 9 inches. Two types of Isomode Pads are available, depending on the loading. Permissible load ranges extend from 100 to 12,000 pounds per mount.

Ajax Airborne Rubber Matting

Ajax Rubber Products Co., 1057 East Eighth St., Jacksonville, Fla., has introduced a new line of rubber matting which finds use both in the home and in shops and offices. "Ajax Airborne Anti-Fatigue Matting" is said to reduce the fatigue resulting from standing for long periods of time. The matting features over 1,000 air chambers per square foot. It will hold firmly to all floors and prevent slipping. The new matting is available in 24, 36 and 48-inch widths, it is approximately ⅜-inch thick and is available in rolls up to 10 yards long. Ajax Airborne Matting comes in five top colors, red, blue, grey, green and black.

New Oak Rubber Pump-Pak

A new balloon inflator package has been introduced by the Oak Rubber Co., Ravenna, Ohio. The package itself is the balloon inflator. In use, the package is emptied of the balloons; one balloon is inserted over a nozzle at the end of the package and pumped up with short, fast strokes. The new "Pump Pak" contains 36 Oak Rubber balloons in assorted sizes, plus an idea booklet showing the uses of balloons for decorations, games and party favors.



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A survey and opinion on the use of lithopone versus titanium dioxide in natural rubber.

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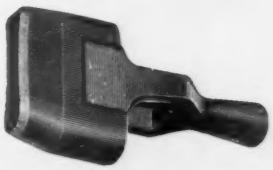

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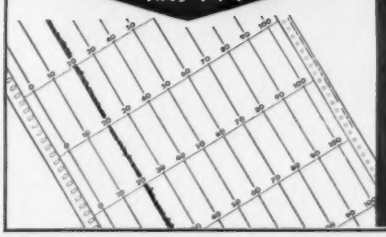

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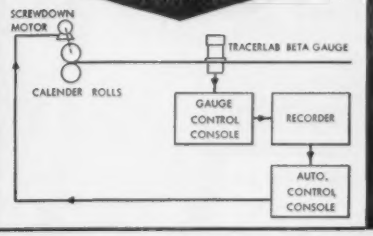

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- **Workers like Tracerlab Beta Gauges because they are easy to operate and cut the work load way down.**
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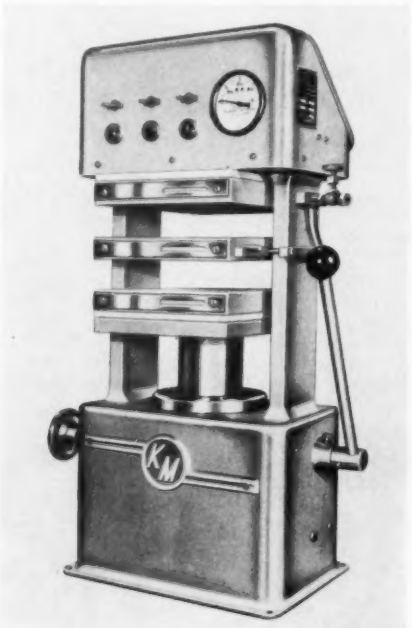
Standard of the World

New Equipment

KM-2 Hydraulic Press

An improved and extremely versatile hydraulic press specially designed for laboratory use, testing, laminating, and rubber and plastic molding, has been announced by the Hydraulic Division of Kingsbacher-Murphy Co., 6245 Lexington Ave., Hollywood 38, Calif. Featuring a newly designed two stage hydraulic pump which automatically switches from low to high pressure, the KM-2 develops up to 40,000 pounds on the platens. The upstroke on the hydraulic control lever is used for low

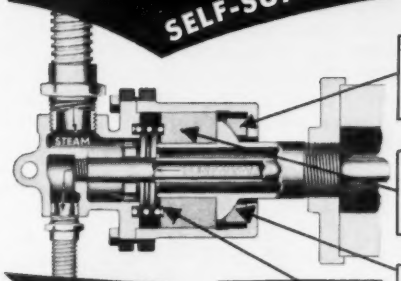


pressure work to raise the ram rapidly, while the downstroke is employed for high-pressure work. Individual thermoswitches permit accurate temperature control up to 600°F. in each of the platens by means of cast-in electric heaters which operate on either 110V or 220V A. C. or D. C. Water cooling is made possible by cast-in steel coils which may also be utilized for oil, steam, or air heating.

The control panel is isolated and cooled by air space between the housing and upper platen and all components inside the cabinet are easily accessible for inspection or servicing through a hinged door. All electrical parts for each platen, such as switch, plug, relay, etc., are mounted on a separate plaque for easy removal, replacement, or addition of extra platens. The frame of the KM-2 is of all-steel welded design, giving the press a maximum of strength and durability for a minimum of weight and size, and a 10¾ inch horizontal clearance between the frames permits the use of extra large moulds.

The KM-2 is available in 2, 3, and 4 platen models in both the 8 by 8 inch and 9 by 12 inch platen sizes. A special model is available with an electric pump, push button or single lever control, and automatic timing and pressure regulator.

JOHNSON Rotary Pressure JOINT
SELF-SUPPORTING TYPE



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Type SB shown handles both steam and condensate through same head; also available for through flow service, and in sizes and styles for all operating conditions. ***Write for literature.***

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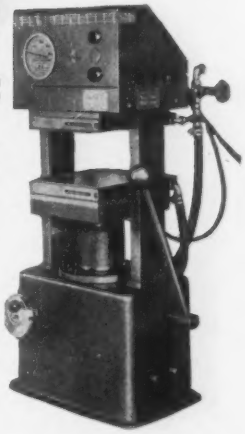
- Special hot-cold laminating presses
- Modification to suit customer requirements.



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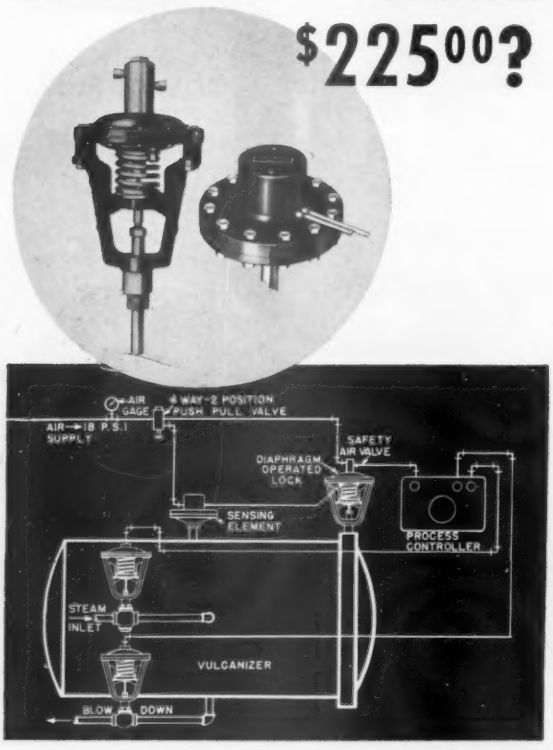

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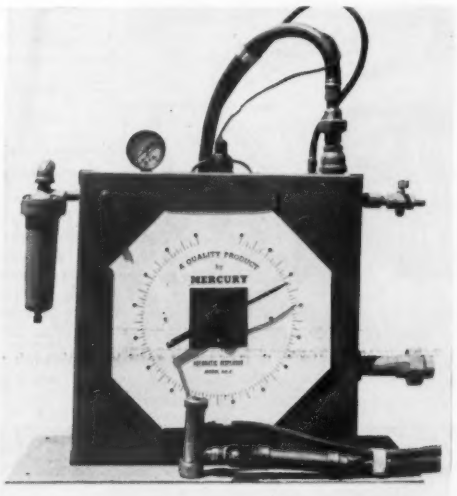
WESTON *Instruments*

Vinyl Plastisol Dispenser

Three new dispensing units have been developed by Mercury Industries, Inc., Hillsdale, Bergen County, N. J. These units were designed especially for use with vinyl plastisol. Up to this time, there has been no equipment available for dispensing accurately measured amounts of vinyl plastisol, the company states. The availability of these new units developed by Mercury



makes it unnecessary from now on to use inaccurate makeshift devices or equipment originally designed to handle liquids other than vinyl plastisol. The three new dispensing units consist of the Model AD, an extremely accurate automatic unit which allows infinite adjustment from 15 grams to more than 1600 grams with a rapid rate of discharge. A specially designed drip-proof nozzle is an important part of the unit.

The Model AD-E employs the same drip-proof nozzle and handles from 12 grams to 1300 grams. This unit is smaller than the Model AD and was developed for use in those applications where it is extremely important to be able to adjust instantly from one measurement to another without loss of time. The Model MD is a manual dispenser, using the same non-drip nozzle and is intended for use where multiple filling is required. This unit is for bulk dispensing.

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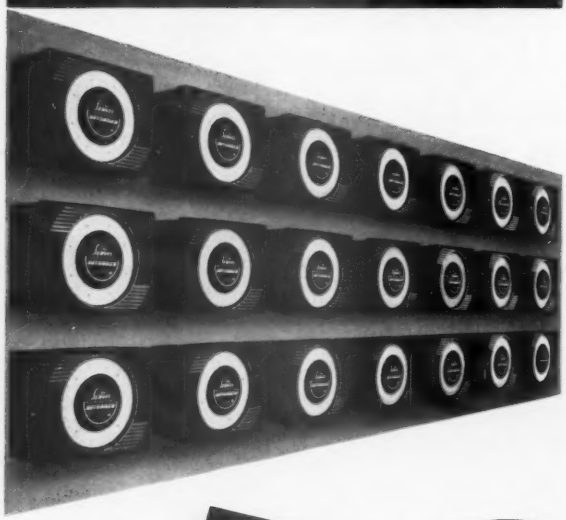

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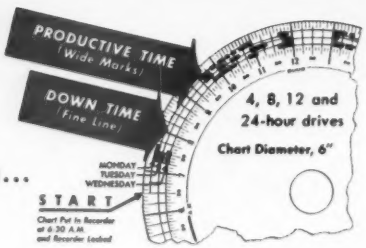

"Model M Servis Recorders gave us the key to consistency in quality, cut rejects and naturally improved profits." A rubber molding plant installed this panel of Servis Recorders in the foreman's office to check the baking cycle of its products, and found that at certain times of the day this cycle was incomplete. Result—rejects . . . high costs . . . idle men and machines.

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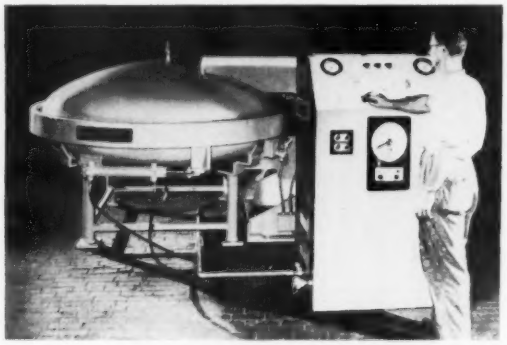
P & D Automatic Autoclaves

Fully automatic operation is the keynote of a new line of autoclaves introduced by Philips & Davies, Inc., Kenton, Ohio. These machines feature true "push button" operation, with the timer, heat control, cycling control, air control, water control, steam control and opening and closing mechanism all completely automatic. The autoclave maintains constant pre-set temperature during all of its cycles, and records a written record



of each complete cycle. These automatic controls give pin-point accuracy of both heating and cooling, during the curing and cooling cycles. Silent, trouble-free hydraulic operation raises, lowers and locks the autoclave lid as required by the pre-set cycle upon which the machine is operating.

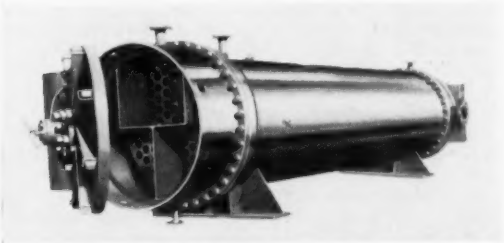
A special Philips & Davies designed silicone rubber gasket gives a positive seal and absolutely prevents any leakage, besides giving extremely long gasket life. The special design locking mechanism is completely safe and fully automatic, the company states. In case of power failure, manual controls are provided to allow removal of the part being processed, in order to prevent spoilage. One man and a helper can operate up to a bank of 8 autoclaves. Their push button operation saves countless hours of labor and watching. A man is not kept at one machine, since once the cycle is started by pushing a button, everything is fully automatic.

P-K Lever-Lock Door

A new, self-seating, quick-opening door, developed by the Patterson-Kelley Co., Inc., East Stroudsburg, Penna., is said to considerably reduce the time to open heat exchangers, autoclaves, setrilizers and other pressure vessels. Taking about five seconds to open, the "p-k Lever-Lock Door" is locked and unlocked by means of bars. Standard exchanger doors are normally bolted closed, and require an hour or more to take off and put on.

The Lever-Lock Door is particularly suited for use on heat exchangers that carry high-fouling liquids and require frequent entry for cleaning and inspection. Capable of withstanding temperatures from —70° to 400°F., and pressures ranging from full vacuum to 300 psi., it has also been used successfully on autoclaves and sterilizers in the textile, chemical, food processing and rubber manufacturing industries. The bars on the door are inserted into and withdrawn from fittings in the vessel by a hand-operated lever.

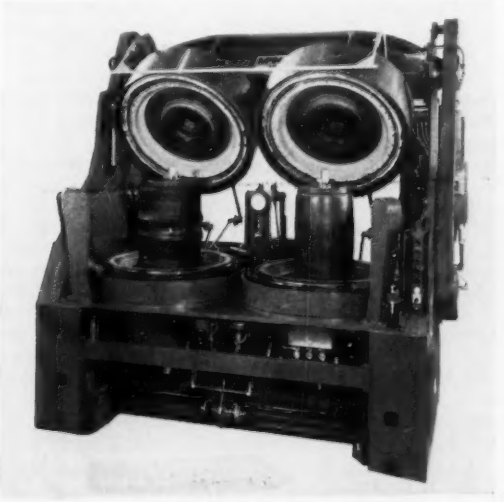
The lever, located at the center of the door, opens with a turn of 60° and with about a 15-pound pull. The door can be swung open manually or by means of a pneumatic cylinder. The Lever-Lock has a tight-fitting closing gasket and automatically seats itself when closed. A mechanical lock safety device prevents the door from



being opened while the vessel is under pressure. The new door may be used on either horizontal or vertical installations; in vertical operation, a pneumatic lifting mechanism is required, since large models of the door weigh in the neighborhood of 300 pounds. Lever-Lock doors are designed and fabricated to meet all code requirements.

Twin-Platen Bag-O-Matic

A new, smaller, simpler and lower-cost 40-inch twin Bag-O-Matic tire curing press has been announced by the McNeil Machine and Engineering Co., 96 East Crosier St., Akron, Ohio. Now in large volume production, the new press—designated as "Model 230-40"—is unusually compact yet possesses a high degree of



flexibility. It will cure the full range of passenger-size tires through 8.20/15 as well as small truck and industrial-type pneumatic tires in rim diameters from 12 to 20 inches. It is available in steam platen, steam dome or steam back design. Engineered to shape, cure and remove tires in the simplest manner, it is a high production unit. All of the latest design features of current McNeil-Akron presses are incorporated into the new model including automatic lubrication.

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Write for Bulletin A-11

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Reviews

BOOKS

Practical Latex Work. By H. J. Stern. Published by the Blackfriers Press, Ltd., Smith-Dorrien Road, Leicester, England. 4¾ x 7¼ in. 96 pp. (Tentative price $2.00).

This is the third edition of the book which was originally published in 1940. A second edition made its appearance in 1947 and this edition was reprinted the following year. Since publication of the second edition, two important changes have occurred. In the first place, many patents have now expired, so that processes previously confined to one concern are now available to all. Foam is the most important example in this category. Secondly, a wide range of synthetic latices is now available. Both these factors have made it necessary for the author to include much new material. Apart from the section on spreading, little has been omitted from this new edition.

In rewriting the greater part of the text, Dr. Stern has made a new presentation of much of the subject matter, with emphasis on those applications of greatest importance in the industry. Those sections dealing with latex foam, thread, paper and rubberized hair have been expanded. The chapter on synthetic latices has been greatly enlarged and should be of considerable value to those interested in evaluating these new materials in both new and old operations. In presenting this new edition, the author has held to his original objective to supply the type of information required in daily operations.

In his work, Dr. Stern presents a discussion of natural latex; the preparation of mixes for rubber manufacture; the manufacture of dipped goods; synthetic latices and their applications, and miscellaneous processes, including the application of latex to textiles and fibers. He also discusses the cost factor as it applies to latex work. The book offers many interesting photographs, diagrams and tabular material. A complete table of contents has been provided.

•

Process Engineering Economics. By H. E. Schweyer. Published by the McGraw-Hill Book Co., 330 West 42nd St., New York 36, N. Y. 6 x 9 in. 410 pp. $7.50.

Part of the McGraw-Hill Series in Chemical Engineering, this book was prompted by the increasing emphasis on economics in curricula for training students to enter metallurgical, chemical, petroleum, ceramic, food, and other engineering fields dealing with the processing of materials. However, it is also an excellent reference book for practicing engineers and other personnel in the process industries. In a sense, it is a simple, teachable text that explains the practical use of cost data in evaluating the economic feasibility of processes, based on theoretical economy principles. The book has 12 chapters and both author and subject indexes. A number of appendixes are included covering, among other subjects, a glossary of selected terms, an abridged list of costs for materials, and estimated costs on equipment, construction and operation.

•

Current Practice in the Development of Management Personnel. By James C. Sinnigen. (Research Report No. 26). American Management Association, 330 West 42 St., New York 36, N. Y. 6 x 9 in. 36 pp. $1.75.

Based on data furnished by 460 companies, this report describes management development techniques most frequently used in modern industry. The importance of this subject can readily be seen in the various tables presented in the booklet. These tables graphically show that 54 percent of the responding companies have some systematic plan to facilitate the development of people in or for management responsibilities. The study is presented in three parts: (1) A survey of company procedure, (2) Management personnel development in action, and (3) Getting the most from management personnel development. With the increasing concern of top management on executive replacement and development, the author lists certain fundamentals necessary for management development.

BOOKLETS, CATALOGS, etc.

Compounding and Processing with Carbon Black and Non-Black Pigments. By W. E. Galwardy. (Technical Bulletin No. 7. Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. 8½ x 11 in. 108 pp.

Divided into three parts and containing forty-five tables listing both unaged and aged properties, this booklet presents compounding and processing studies of black and non-black pigments. A comparison of various loadings of channel, furnace and thermal blacks in Paracril C, B and AJ is included in part one. The second part, also using the three types of Paracrils, outlines studies of reinforcing and non-reinforcing pigments including silicon dioxide, calcium silicate, clay and natural calcium carbonate. The third part lists the test methods and fluids used as well as the type, trade name and supplier of both the pigments. The entire study shows processing data on all compounds and includes such tests as Mooney viscosity, scorch time, cure rate and calender shrinkage. In addition to the processing data, the study shows the results of such physical tests as tear resistance, resilience, low temperature brittle point and compression set. Immersion data is given on the ASTM oils and fuels as well as distilled water, ethylene glycol and castor oil.

•

Kel-F Fluorocarbon Oils, Waxes and Greases. Chemical Manufacturing Division, M. W. Kellogg Co., Box 469, Jersey City 3, N. J. 8½ x 11 in. 20 pp.

The chemical structure, specifications, properties, applications and general description of a new group of fluorocarbon oils, waxes and greases for industrial use are described in this booklet. These products, based on the stable polychlorotrifluoroethylene molecule, exhibit outstanding resistance to chemical attack and other corrosive conditions, temperature extremes and physical breakdown. Among the applications suggested are pump fluids, damping fluids, heat transfer media and permanent lubricants for instruments and clocks. In addition, the booklet discusses color and clarity, viscosity, specific gravity, surface tension, flammability, vapor pressure, dielectric properties,, acidity, chemical stability and solubility of the various materials.

•

Santocure MOR: A New Safe Processing Accelerator. Monsanto Chemicals, Ltd., Victoria Station House, London S.W.1, England. 8 x 10 in. 16 pp.

The development of the furnace type carbon blacks and the speeding up of factory processes has caused new problems in the rubber industry, one being processing safety. This bulletin describes Santocure MOR which, according to the company, is designed to meet these new conditions. Included in the bulletin are scorch and curing characteristics which are detailed on tables and graphs, giving the reader an easy reference. Also included in the report are physical properties of typical compounds, comparing Santocure MOR with Santocure. The data in this report is based on stocks containing smoked sheets, whole tire reclaim and GR-S (Krylene N.S.).

•

Behind These Doors. Walter Kidde Constructors, Inc., 140 Cedar St., New York 6, N. Y. 9 x 12 in. 56 pp.

This excellent photographic essay shows the amazing versatility of one American company, namely, Walter Kidde. Using over 75 photographs, the publication gives the reader an inside view of the many services performed by the company as well as a glimpse of its various plants and operations. The diversity of this company can readily be seen in the photographs showing construction of manufacturing plants for such industries as: pharmaceuticals, petroleum products, steel and ship building. In addition to engineering services, the booklet points out in photographs and text the company's manufacture of inflation equipment for life rafts, burglar detectors, fire extinguishers, textile machinery and many other products.

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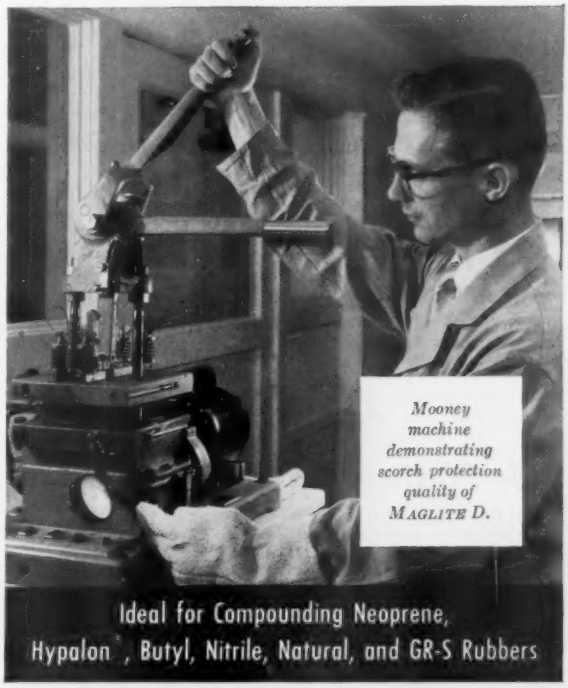
The Performance-Proved Brand of Magnesium Oxide


Mooney machine demonstrating scorch protection quality of MAGLITE D.
Ideal for Compounding Neoprene, Hypalon®, Butyl, Nitrile, Natural, and GR-S Rubbers

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REVIEWS (CONT'D)

Heel and Sole Compounding. By C. W. Lawson. (Report No. 35). Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. 8½ x 11 in. 32 pp.

This bulletin describes the manufacture of heels and soles. Photographs depict milling, cutting and molding of the raw stock as well as trimming and inspection of the finished product. Particular attention has been paid to economy in cost and good processing characteristics. Some 40 compounds are shown, including those utilizing GR-S 1503 and 1013 and blends of GR-S and natural rubber. Data on tear resistance, abrasion index, permanent set, elongation, tensile and 200 percent modulus are given on press cures of 3, 6, 8 and 10 minute cycles. In addition the formulations are arranged according to high quality types, standard quality, competitive quality, Army grade and super quality.

•

Neoprene Solvent Cements, by Louis S. Bake. (Report No. 55-4) E. I. du Pont de Nemours & Co. Inc., Elastomers Div., Wilmington, Del. 6 x 9 in. 43 pp.

This new bulletin outlines the preparation and properties of neoprene cements. It is illustrated with photos of various types of mixing equipment and descriptions on how to use them. Graphs and charts are effectively used to show the properties of cements prepared from various types of neoprenes, such as type WRT, type GN and type WHV. Accelerator studies as well as solvent studies are also included. In addition, practical formulas for solvent-type adhesives are to be found at the end of the booklet.

•

Softeners in Nitrile Rubber. (Rubber Laboratory Release No. 15). Barrett Division, Allied Chemical & Dye Corp., 40 Rector Street, New York 6, N. Y. 8½ x 11 in. 4 pp.

The application of "Cumar" Resin MH-2½, dibutyl phthalate and diethylene glycol in a mineral-filled nitrile elastomer is discussed in this technical report. The evaluation data presented in this report suggests the use of the compound in oil-resistant soling, floor tile, mechanical goods, and automotive and aeronautical products. Specific information furnished covers cut-growth resistance, brittleness temperature and immersion tests. The ASTM test procedures involved are listed for handy reference.

•

A-C Polyethylene for Rubber Compounding. (P/S 97) Semet-Solvay Petrochemical Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y. 8½ x 11 in. 8 pp.

This new brochure, listing ways that A-C Polyethylene speeds-up rubber compounding, reduces shrinkage and lowers cost, has just been released. The report presents typical laboratory formulations of "Hycar," smoked sheets and neoprene. Tables outlining both Mooney Scorch and Mooney viscosity are included. In addition, the release presents physical properties of both unaged and aged samples.

•

Measurement of Vibration. General Radio Co., 275 Massachusetts Avenue, Cambridge 39, Mass. 6½ x 10 in. 64 pp.

This interesting publication covers the meaning of vibration terms, and offers descriptions of vibration-measuring instruments, procedures, typical examples, and interpretation of results. A short section of the booklet is devoted to the human response to mechanical vibration. A catalog section appended to the booklet lists the various units available from the company for metering and analyzing sound and vibration.

•

Abitol: A Primary Alcohol. Synthetics Department, Hercules Powder Co., Wilmington 99, Delaware. 8½ x 11 in. 20 pp.

This technical booklet describes the properties and applications of Abitol, a primary, monohydric alcohol. The major use of the material is in alkyd resins. Various sections deal with physical and chemical properties, alkyd resin design and effects of monofunctional alkyd modifiers on resin characteristics. Additional information on applications in adhesives, fixatives, hot-melt coatings, oil additives, wax additives and surfectants is included.

Solution Coatings of Hypalon Chemical Rubber. (Report BL-297). Elastomers Division, E. I. du Pont de Nemours & Co. Inc., Wilmington 98, Delaware. 6 x 9 in. 16 pp.

This report presents a detailed study of Hypalon coatings from the mixing stage to the actual application of the coating. Included in the report are results of studies of general compounding principles outlining various types of mixing equipment to use. The formulas used and the resulting physicals are shown in tabular form. Also described is the use of numerous pigments and fillers for colored Hypalon-base rubber paint. An accompanying table lists the color, class, shade and amount of pigment and filler to use. In addition to colored paints, clear lacquer formulations are also given.

•

Solubility of Zinc Oxide in Preserved Hevea Latex. By M. Van Den Tempel. (Communication No. 229). Rubber-Stichting, Delft, Holland. 5½ x 8½ in. 16 pp.

In an effort to measure and control the sensitivity of Hevea latex in regard to the addition of zinc oxide, numerous methods have been described, none of which have been generally accepted. This booklet outlines a method by means of polarography. Using model solutions containing an ammonium salt together with free ammonia, the report indicates a relation between the composition of the latex, as given by its pH and ammonia content, and the solubility of zinc oxide in the serum. The data assembled in this study are shown on graphs listing solubilities and relationships of zinc oxide to the latex.

•

Sterling V and Vulcan 6 in Truck Tire Compounds. By T. D. Bolt. (Bulletin No. GD-12). Godfrey L. Cabot, Inc., 77 Franklin St., Boston 10, Mass. 8½ x 11 in. 6 pp.

For the purpose of simplifying truck tire compounds, this technical bulletin evaluates the use of two oil furnace blacks in truck treads, outer ply-breaker stocks and inner ply stocks. A single compound was selected to represent stocks that might be used in outer plies, cushions and breakers. Variations in black loading and softener content for the best balance of physical properties are also included. Divided into three tables the bulletin shows data on rebound, torsional hysteresis, heat build-up, dynamic compression and permanent set.

•

New Horizons for Epon Resins. Shell Chemical Corp., 380 Madison Ave., New York 17, N. Y., 5½ x 7 in. 24 pp.

Presented in non-technical language, this booklet effectively lists new ways of using Epon resins. Each article is illustrated by a full-page photograph pertaining to the product covered in the story. In addition, the booklet outlines coating problems on such diversified items as: ball-point pens, valves, reflectors, miniature transformers and hot-water tanks. Methods of using Epon resins indicate how each particular problem was solved.

•

Marvinol VR-30: Polyvinyl Chloride Resin for Film and Sheeting. (Bulletin No. 2). Naugatuck Chemical Division, U. S. Rubber Co., Naugatuck, Conn. 8½ x 11 in. 12 pp.

The physical properties of VR-30, a vinyl resin developed for calendering, are discussed in this booklet. Because the material exhibits a consistent color retention it is suggested that it be used in such colored articles as rainwear, floor tile and upholstery. Processing data on calendering, extrusion and injection molding are included.

•

Synvar Resorcinol Resins. Synvar Corp., Wilmington 99, Delaware. 8½ x 11 in. 16 pp.

Illustrated with graphs and tables, this booklet describes the use of the various Synvar resins in the treatment of rayon and nylon for subsequent adhesion to rubber. Typical formulas employing natural rubber, GR-S types and reclaim are also given. In addition the bulletin outlines bonding procedures for wood to metal, metal to metal, hard rubber, Celotex, Lucite, Mylar and polyethylene.

COULTER

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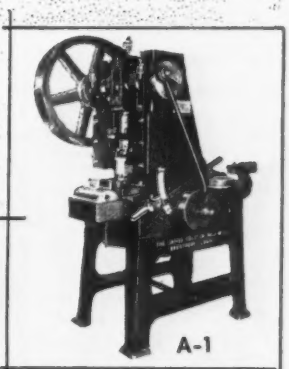
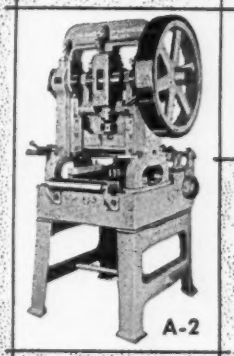


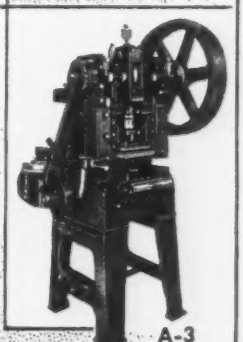


MODEL A-1
Cutting Heels at high speed production or short runs.

MODEL A-2
Cutting Multiple Heels, Half and Full Soles with stock grain.

MODEL A-2s
(Not illustrated)
Cutting across grain of stock.

MODEL A-3
Cutting Multiple Heels and Taps with or across stock grain.



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MARKETS

NEWS-PRICES

NEW YORK, NOVEMBER 7, 1955

Natural Rubber

Since our last report (October 7), the price of spot rubber on the New York Commodity Exchange has moved in the rather wide range of 525 points, high for the period being 44.75c reached on October 18, and low being 39.50c reached on November 2. The average price of spot rubber for the month of October was 43.81c based on 20 trading days. This compares with an average of 48.27c in the previous month.

It is common knowledge that the rubber market traditionally is subject to wide price movements, but the movements of late are even more pronounced than the speculative element likes to see. What is more, these exaggerated price swings do not reflect any basic change in fundamentals, many in the trade point out.

It is reported that the government of Malaya is concerned over the decline in rubber prices. Malayan producers are estimated to have lost $50,000,000 (Malayan) as a result of recent price drops, while the total export duty and anti-inflationary cess collected by the government fell by $25,000,000 (Malayan). Rubber circles in Kuala Lumpur attribute the price drop to Singapore speculators who were said to be manipulating the price to their own profit.

To Pay Increased Prices

Communist China has agreed to pay increased prices for sheet rubber sold under a new Sino-Ceylonese trade agreement. A spokesman for the Commerce Ministry in Colombo, Ceylon, said that a trade delegation had reported from Peiping that it had successfully negotiated a price increase for rubber delivered from June until the end of 1955.

The new deal will be on a sliding scale based on Singapore prices. The Chinese will pay 5 pence (about 5 cents) in excess of the Singapore price if the Singapore market averages between 22 and 34 pence a pound a month. If Singapore prices average between 35 and 39 pence a pound, Ceylon will receive 4 pence in excess of this price. If Singapore prices rise above 39 pence, Red China will increase her price by 3 pence a pound.

As a result of China agreeing to pay increased prices beginning in June, 1955, Ceylon is expected to earn an additional 7,000,000 rupees (about $1,400,000) for all shipments made between June and September this year. Ceylon shipped 1,800 tons in June, 300 tons in July, 900 tons in August and 2,200 tons in September. The two countries have also agreed not to alter the quota and price of rice that Ceylon will buy from Red China until the end of 1955.

Liberian Shipments Up

Firestone reports that its plantations in Liberia will export more natural rubber this year than a dozen other countries throughout the world who began producing natural rubber long before the company began its African operations. Since Firestone began rubber production in Liberia about twenty years ago, that country has climbed to sixth position among the rubber producing areas of the world.

Price Data

Closing Rubber Prices on New York Commodity Exchange (No. 1 R.S.S. Contract)

FROM OCTOBER 8 TO NOVEMBER 7

Oct.	Spot	Dec.	March	May	July	Sales
8	....	....	....	....	....	....
9	....	....	....	....	....	....
10	43.00	42.05	39.75	38.50	37.35	467
11	42.75	42.55	40.00	38.70	37.45	243
12	....	....	....	....	....	....
13	42.50	41.70	39.50	38.30	37.00	398
14	42.50	41.25	38.95	37.90	36.60	286
15	....	....	....	....	....	....
16	....	....	....	....	....	....
17	43.00	41.95	39.30	38.05	36.50	246
18	44.75	44.00	41.10	39.85	38.30	467
19	44.50	43.45	40.50	39.20	37.80	318
20	43.25	42.45	40.00	38.60	37.40	349
21	42.75	41.80	39.35	38.00	36.80	366
22	....	....	....	....	....	....
23	....	....	....	....	....	....
24	44.25	43.05	40.50	39.20	37.90	184
25	45.00	43.50	41.25	39.65	38.40	316
26	43.75	42.40	40.40	38.85	37.60	295
27	43.50	42.20	40.25	38.75	37.45	251
28	43.50	42.40	40.30	38.80	37.55	68
29	....	....	....	....	....	....
30	....	....	....	....	....	....
31	41.75	40.80	38.80	37.40	36.40	260
Nov.						
1	41.50	40.45	38.40	37.10	36.05	225
2	39.50	37.70	35.70	34.55	33.55	602
3	40.00	37.70	35.90	34.85	33.85	490
4	41.00	40.25	38.30	37.25	36.25	653
5	....	....	....	....	....	....
6	....	....	....	....	....	....
7	41.00	40.25	38.10	37.00	35.90	389

Outside Market

No. 1 Ribbed Smoked Sheets:	
Spot	.41
November	.40¾
December	.39¾
Thin Latex Crepe:	
Spot	.43½
Thin Brown Crepe, No. 2	.32½
Flat Bark Crepe	.27

London Market

(Standard Smoked Sheets)

December	38.97 - 39.26
Jan.-Mar.	38.53 - 38.83

Singapore Market

(Standard Smoked Sheets)

December	36.38 - 36.45

Middling Upland Quotations

	Oct. 7	November 7		
	Close	High	Low	Close
December	31.86	33.58	33.45	33.45
March	30.80	32.65	32.43	32.43
May	30.33	31.29	31.10	31.11

Notes and Quotes

According to Harold Gray, technical director of the B. F. Goodrich Co. Tire and Equipment Division, inner tubes "will soon be as extinct as a dodo bird and will never return for automotive service". In a recent address before the Los Angeles Rubber Group, Mr. Gray said that tubeless tires for certain types of farm service and off-road grading are still on an experimental basis but that a "rim and tire combination will undoubtedly be agreed upon within the coming year." Mr. Gray offered as evidence the fact that Goodrich tube production nationwide has been drastically reduced during the past year in favor of increased tubeless tire output. "The switch to tubeless throughout the automotive industry was sudden and dramatic," the Goodrich executive said. "Automotive and aircraft engineers want to keep unsprung weight as low as possible and tubeless tires gave that advantage. On commercial airplanes, any reduction in weight permits a greater pay-load." Mr. Gray pointed out that his company has expended in excess of $47,000,000 in the development of tubeless tires.

Synthetic Rubber

That the synthetic rubber industry was heading for a banner year had long been perceived by many in the trade. Recent estimates by the International Rubber Study Group putting production of synthetic rubber in the United States in 1955 at 955,000 long tons, lent additional credence to the situation. It is interesting to note that the Rubber Study Group figure coincides with estimates made by many industry spokesmen some months back.

At the time the synthetic rubber plants were turned over to industry, there were some who could not see any great increase in synthetic production before the new year came around. Not only are domestic requirements being met by the U. S. synthetic industry, but exports are said to have risen "impressively" in recent months.

Explains Export Rises

The Business and Defense Services Administration of the U. S. Department of Commerce states that the lower price of GR-S type synthetic rubber compared with natural rubber was the main reason for the increased demand abroad. Another factor, of course, is that synthetic producers in the United States are shipping more rubber abroad to their branch factories.

According to BDSA, synthetic rubber exports totalled 11,672 long tons valued at $7,551,870 in September, compared with 10,397 tons, valued at $6,476,774 in August. Exports in these two months were at the highest level since early 1946.

In the first nine months of this year, BDSA reports, exports totaled 60,447 long tons valued at $39,821,966. This compares with 21,516 long tons valued at $17,471,635 in the first nine months of the preceding year.

It should be remembered that within the next few months the 122,000 long ton plant at Institute will have been sold to a private company. This plant, with about 10% of the capacity of the industry, will more than likely contribute greatly to the general amounts of synthetic rubber available for export as well as for domestic consumption.

New Supply of Synthetic

According to Department of Commerce figures, the total new U.S. supply of synthetic rubber in the first nine months of the current year totaled 577,258 long tons. This is some 220,000 long tons more than were in new supply in the first nine months of 1954.

With the exception of Butyl rubber, the new supply of all types of synthetic rubber have risen in the first nine months of this year over the comparable period of the previous year. In the first nine months of this year, 41,033 long tons of Butyl rubber were in the "new supply" category, while in the first nine months of the previous year, 43,959 long tons were in new supply.

While uses for Butyl rubber have been on the increase during the past year, there has been a swing away from the use of Butyl in tubeless tires, many in the trade report. For this reason, production tapered off somewhat in the first nine months of this year. Consumption of Butyl in the first nine months of this year amounted to 39,102 long tons against 47,618 long tons in the comparable period of 1954.

In all, it may be said that the U. S. synthetic rubber industry will almost certainly have the ability to meet any demands placed upon it in the coming year. Present capacity plus planned increases should meet all requirements.

PRICES OF COMMERCIALLY AVAILABLE SYNTHETIC RUBBER POLYMERS

(dry types—per pound carload unless otherwise specified)

Butadiene-Acrylonitrile Types

Butaprene NAA	.5400 [2]
Butaprene NF	.4900 [2]
Butaprene NL	.5000 [2]
Butaprene NXM	.5800 [2]
Chemigum N1	.6400 [2]
Chemigum N3	.5800 [2]
Chemigum N5	.5800 [2]
Chemigum N6	.5000 [2]
Chemigum N7	.5000 [2]
Hycar OR-15	.5800 [2]
Hycar OR-25	.5000 [2]
Paracril B	.5000 [2]
Paracril BJ	.5000 [2]
Paracril C	.5800 [2]
Polysar Krynac	.5000 [2]
Polysar Krynac 801	.5800 [2]
Polysar SS-250-K	.3000 [2]

Butadiene-Styrene Types

Ameripol 1001	.2410 [2]
Ameripol 1002	.2435 [2]
Ameripol 1006	.2410 [2]
Ameripol 1500	.2410 [2]
Ameripol 1501	.2410 [2]
Ameripol 1502	.2410 [2]
Ameripol 1703	.2060 [2]
Ameripol 1705	.2035 [2]
Ameripol 1706	.2035 [2]
Ameripol 1707	.1910 [2]
Ameripol 1709	.1885 [2]
Ameripol 1710	.1885 [2]
Ameripol 1711	.1885 [2]
Ameripol 1712	.1885 [2]
ASRC 1500	.2410 [2]
ASRC 1502	.2410 [2]
Baytown 1600	.1850 [2]
Baytown 1601	.1850 [2]
Baytown 1602	.1850 [2]
Baytown 1801	.1700 [2]
Butaprene S-1000	.2300 [2]
Butaprene S-1001	.2300 [2]
Butaprene S-1004	.2300 [2]
Butaprene S-1005	.2800 [2]
Butaprene S-1006	.2300 [2]
Butaprene S-1009	.2455 [2]
Butaprene S-1010	.2450 [2]
Butaprene S-1012	.2700 [2]
Butaprene S-1013	.2500 [2]
Butaprene S-1014	.2700 [2]
Butaprene S-1015	.2800 [2]
Butaprene S-1500	.2300 [2]
Butaprene S-1502	.2300 [2]
Butaprene S-1703	.1950 [2]
Butaprene S-1705	.1925 [2]
Butaprene S-1710	.1775 [2]
Butaprene S-1712	.1775 [2]
Copo 1500	.2410 [2]
Copo 1502	.2410 [2]
Copo 1712	.1885 [2]
Hycar OS-10	.5500 [2]
Naugapol 1016	.2550 [2]
Naugapol 1018	.2600 [2]
Naugapol 1019	.2550 [2]
Naugapol 1021	.2900 [2]
Naugapol 1022	.2600 [2]
Naugapol 1023	.2650 [2]
Naugapol 1503	.2550 [2]
Naugapol 1504	.2650 [2]
Philprene 1000	.2500 [1]
Philprene 1001	.2500 [1]
Philprene 1006	.2500 [1]
Philprene 1009	.2550 [1]
Philprene 1018	.2575 [1]
Philprene 1019	.2525 [1]
Philprene 1100	.1990 [1]
Philprene 1104	.1940 [1]
Philprene 1500	.2500 [1]
Philprene 1502	.2500 [1]
Philprene 1503	.2525 [1]
Philprene 1600	.2000 [1]
Philprene 1601	.2000 [1]
Philprene 1602	.2000 [1]
Philprene 1605	.1940 [1]
Philprene 1703	.2120 [1]
Philprene 1706	.2100 [1]
Philprene 1708	.1970 [1]
Philprene 1711	.1940 [1]
Philprene 1712	.1940 [1]
Philprene 1803	.1800 [1]
Plioflex 1000	.2425 [2]
Plioflex 1006	.2425 [2]
Plioflex 1502	.2425 [2]
Plioflex 1703	.2075 [2]
Plioflex 1710	.1900 [2]
Polysar Krynol	.1890 [2]
Polysar Krynol NS	.1940 [2]
Polysar "S" Types	.2300 [2]
S-1000	.2300 [2]
S-1001	.2300 [2]
S-1002	.2325 [2]
S-1006	.2300 [2]
S-1011	.2325 [2]
S-1013	.2325 [2]
S-1100	.1850 [2]
S-1500	.2300 [2]
S-1501	.2300 [2]
S-1502	.2300 [2]
S-1600	.1850 [2]
S-1601	.1850 [2]
S-1602	.1850 [2]
S-1703	.1950 [2]
S-1705	.1925 [2]
S-1706	.1925 [2]
S-1707	.1800 [2]
S-1709	.1775 [2]
S-1712	.1775 [2]
S-1801	.1700 [2]
Synpol 1000	.2425 [3]
Synpol 1001	.2425 [3]
Synpol 1002	.2450 [3]
Synpol 1006	.2425 [3]
Synpol 1007	.2425 [3]
Synpol 1009	.2475 [3]
Synpol 1012	.2425 [3]
Synpol 1013	.2500 [3]
Synpol 1500	.2425 [3]
Synpol 1551	.2425 [3]
Synpol 1703	.2075 [3]
Synpol 1707	.1925 [3]
Synpol 1708	.1950 [3]
Synpol 1710	.1900 [3]
Synpol 1711	.1900 [3]

Butyl Rubbers

Enjay Butyl 035	.2300 [2]
Enjay Butyl 150	.2300 [2]
Enjay Butyl 165 NS	.2400 [2]
Enjay Butyl 215	.2300 [2]
Enjay Butyl 217	.2300 [2]
Enjay Butyl 218	.2300 [2]
Enjay Butyl 268 NS	.2400 [2]
Enjay Butyl 325	.2300 [2]
Enjay Butyl 365 NS	.2400 [2]
Polysar Butyl Types	.2300 [2]

Neoprene

	(prices l.c.l.)
Neoprene Types AC and CG	.5500 [2]
Neoprene Type GN	.4100 [2]
Neoprene Type GN-A	.4100 [2]
Neoprene Type GRT	.4200 [2]
Neoprene Type KNR	.7500 [2]
Neoprene Type S	.4200 [2]
Neoprene Type W	.3900 [2]
Neoprene Type WRT	.4500 [2]

Silicone Rubbers

	(prices l.c.l.)
GE (compounded)	2.50 [2]
GE Silicone Gum (not compounded)	4.00 [2]
Silastic (compounded)	1.95 [2]

Polysulfide Rubbers

	(prices l.c.l.)
Thiokol Type A	.4700 [2]
Thiokol Type FA	.6400 [2]
Thiokol PR-1	.9500 [2]
Thiokol Type ST	1.00 [2]

(latices—all prices per pound dry weight)

Butadiene-Acrylonitrile Types

Chemigum 200	.4900 [2]
Chemigum 235	.5400 [2]
Chemigum 236	.5400 [2]
Chemigum 245	.4600 [2]
Chemigum 246	.4600 [2]
Hycar 1512	.4600 [2]
Hycar 1551	.5400 [2]
Hycar 1552	.4600 [2]
Hycar 1561	.5400 [2]
Hycar 1562	.4600 [2]
Hycar 1571	.5900 [2]
Hycar 1572	.5100 [2]
Hycar 1577	.4600 [2]

Butadiene-Styrene Types

Butaprene S-2000	.2600 [2]
Butaprene S-2001	.2600 [2]
Butaprene S-2002	.2850 [2]
Butaprene S-2003	.2950 [2]
Butaprene S-2004	.2950 [2]
Butaprene S-2006	.2600 [2]
Copo 2101	.2800 [3]
Copo 2102	.3100 [3]
Copo 2105	.3100 [3]
Copo X-765	.2900 [3]
Pliolite 2101	.3000 [3]
Pliolite 2104	.3200 [3]
Pliolite 2105	.3200 [3]
Pliolite X-765	.3000 [2]
Naugatex 2000	.2630 [2]
Naugatex 2001	.2630 [2]
Naugatex 2002	.2880 [2]
Naugatex 2005	.3000 [2]
Naugatex 2006	.2630 [2]
Naugatex 2101	.2850 [2]
Naugatex 2105	.3120 [2]
Naugatex X-767	.3230 [2]
S 2000	.2275 [2]
S 2004	.2600 [2]
S 2101	.2250 [2]

Neoprene

Neoprene Latex 571	.3700 [2]
Neoprene Latex 572	.3900 [2]
Neoprene Latex 601-A	.4000 [2]
Neoprene Latex 735	.3800 [2]
Neoprene Latex 736	.3800 [2]
Neoprene Latex 842-A	.3700 [2]
Neoprene Latex 950	.4700 [2]

Polysulfide Rubbers

Thiokol Type MX	.7000 [2]
Thiokol Type WD-2	.9200 [2]
Thiokol Type WD-6	.7000 [2]

Notes: (1) Freight allowed. (2) Freight extra. (3) Freight prepaid.

Interested in Rubber Statistics—Markets—Prices?

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RUBBER AGE

101 West 31st Street, New York 1, N. Y.

MARKETS

NEWS-PRICES

NEW YORK, NOVEMBER 7, 1955

Reclaimed Rubber

The Department of Commerce indicates that in the first nine months of the current year, 240,752 long tons of reclaimed rubber were produced in the United States. During the same period, 555 long tons of reclaim were imported, making for a total new supply of 241,307 long tons. In the same period of the preceding year, total new supply ran to 185,759 long tons.

At the current rate of production, figures at the year end should show a total in excess of 300,000 pounds. The last year in which more than 300,000 long tons of reclaim were produced was 1951, when total production amounted to 365,933.

Commerce Department figures show that through September of this year, 236,544 long tons of reclaim were consumed. In the first nine months of the previous year, 180,084 long tons of reclaim were consumed. At the current rate of production, consumption of reclaim in 1955 should also pass the 300,000 long ton mark. The last time more than 300,000 long tons of reclaim were consumed was also in 1951.

(Prices for All Areas Except Calif.)

	per lb.
Premium Grade Whole Tire	.11
First Line Whole Tire	.10½
Second Line Whole Tire	.10
Third Line Whole Tire	.09¾
Fourth Line Whole Tire	.09¼
Black Carcass	.14¾
No. 1 Light Colored Carcass	.20¾
No. 1 Peel	.11
Butyl Tube Reclaim	.16
Natural Rubber Black Tube	.15
Natural Rubber Red Tube	.21
Natural Rubber Gray Tube	.21

Scrap Rubber

Scrap rubber exports during July declined from those of June, according to the latest figures released by the Department of Commerce. July's exports of scrap rubber fell to 2,606,250 pounds from June's 3,481,782 pounds. While the exports declined in poundage, the dollar value in July increased to $108,767, from June's $92,446.

Spain was the best customer for scrap rubber from the U. S. in July, taking 1,315,767 pounds. France took 350,596 pounds, the Netherlands 134,704 pounds, Canada 171,145 pounds, and West Germany, 103,834 pounds. Imports of scrap rubber in July totaled 1,716,873 pounds valued at $73,822, compared with 1,721,233 pounds worth $97,426 in the preceding month.

(Prices Delivered Akron)

Mixed tires	ton	17.00
Light colored carcass	lb.	.05½
No. 1 peelings	ton	45.00
No. 2 peelings	ton	30.00
No. 3 peelings	ton	24.00
Buffings	ton	17.00
Truck and Bus S.A.G.	ton	17.00
Passenger S.A.G.	ton	15.00
Natural Rubber Red Tubes	lb.	.08
Natural Rubber Black Tubes	lb.	.06
Butyl Rubber Tubes	lb.	.07½

Tire Fabrics

Trading in the industrial fabric market in recent weeks has been highlighted by sales involving substantial yardages of cotton ducks for deliveries running well into the first quarter of 1956. All types of cotton ducks were selling in good volume at current price levels, and this trade activity gave an additionally buoyant tone to the generally strong industrial fabrics market.

Wide goods, including wide drills, sateens and sheetings, have been selling in substantial volume over the last several weeks, with many mills now heavily booked for this quarter. In addition, many mills are taking orders for delivery during the first few months of next year.

Cotton ducks have also been displaying a firm tone. A definite acceleration in forward buying of these goods has become evident within the past few weeks. To a certain extent this pickup was expected, as a revival in buying cotton ducks normally develops in the Fall as many consumers cover against their seasonal operating requirements.

Rayon Yarn Shipments Up

U. S. producers in October shipped a total of 102,800,000 pounds of rayon and acetate yarn and staple and tow, according to the Textile Economics Bureau. These shipments were slightly above those of September, but were 6% over the 97,400,000 pounds shipped in October of 1954. Shipments in October, 1955, consisted of 103,300,000 pounds to domestic consumers, and the balance for export.

For the first ten months of the current year, rayon and acetate shipments by domestic producers totaled 1,049,600,000 pounds, 17% greater than in the comparable period of the preceding year.

During October, high tenacity rayon yarn shipments dropped 1,000,000 pounds compared to September, but exceeded shipments in October, 1954, by 24%. With shipments just under production, stocks in the hands of producers increased slightly to 5,700,000 pounds.

Licenses French Firm

E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., has announced that it has concluded negotiations with the Comptoir des Textile Artificiels, which will permit the French concern and its European associates to produce high tenacity rayon yarn of the type sold by DuPont as "Super Cordura". It was emphasized that the licensing of the French firm does not give it the right to the "Super Cordura" trademark.

(Prices f.o.b. Shipping Point)

Rayon Tire Cord

1100	lb.	.76½
1650	lb.	.73½
2200	lb.	.73

Nylon Tire Cord

210	lb.	2.00
840	lb.	2.00

Rayon Graded Fabric

1100	lb.	.72
1650	lb.	.69½
2200	lb.	.68½

Cotton Chafers

14.4 oz. (per square yard)	lb.	.70
9.25 oz. (per square yard)	lb.	.65
11.65 oz. (per square yard)	lb.	.61
8.9 oz. (per square yard)	lb.	.67

Liquid Latex

Natural: According to estimates by the Department of Commerce, 63,625 long tons of natural rubber latex were consumed in the United States in the first nine months of the current year. This compares with the 52,261 long tons consumed in the first nine months of the preceding year.

Imports of natural rubber latex in the first nine months of 1955 should total about 73,000 long tons, according to trade estimates. This will be almost 30,000 long tons more than were imported in the first nine months of the previous year when 45,570 long tons came into the United States.

Prices for ASTM Centrifuged Hevea latex during the past period have ranged from about 50 to 61c, rail tank quantities, f.o.b. cars, East Coast port. Many in the trade are still of the opinion that the price level in the first few months of the coming year will be somewhat lower than current quotations.

Synthetic: Figures available for synthetic latex production in the first nine months of the current year show that in all cases current figures are considerably ahead of those in the previous year. In the first nine months of 1955, for example, production of GR-S type latices totaled 48,808 long tons, more than 16,000 long tons more than were produced in the first nine months of the preceding year.

As for neoprene latices, 7,544 long tons were produced in the first nine months of this year, about 1,500 long tons more than were produced in the first nine months of 1954. N-type latex production in the first nine months of this year has almost doubled production in the comparable period of 1954—8,197 to 4,904 long tons.

The current price structure for synthetic latices remains stable and it is expected that this situation will hold for the balance of the current year.

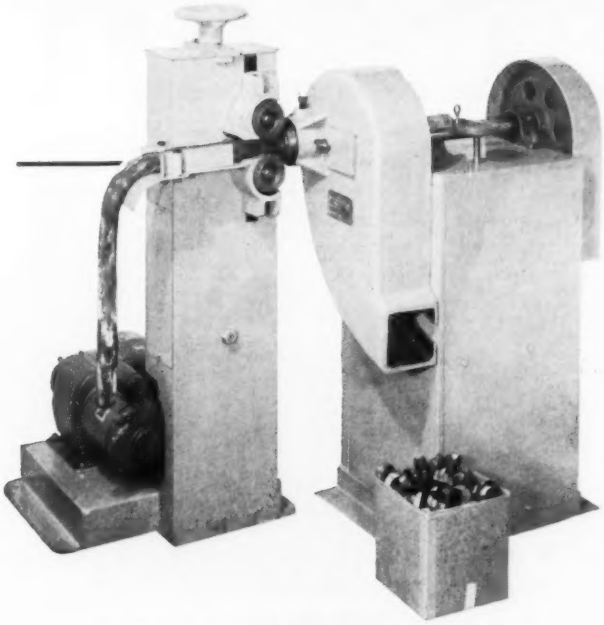
Cotton

The price of middling uplands on the New York Cotton Exchange has moved in a range of 130 points since our last report (October 7), high for the period being 34.80c reached on November 4, and low being 33.50c reached on October 10. The average price of middling uplands for the month of October was 33.93c based on 20 trading days. This compares with an average of 33.85c in September.

The International Cotton Advisory Committee has warned that if present trends continue there may be enough production abroad in "two or three years" to meet world requirements without the import of a single bale of American cotton. This country is already burdened with a heavy carryover of cotton, largely because of a sharp drop in exports over the past few years.

The report emphasized the seriousness of the present world surplus in raw cotton. In the current 1955-56 cotton season, the report said, records will be set for production outside the United States, total free-world production, supply in the United States, and aggregate free-world supply.

The report said that total U. S. supply this season will be 25,000,000 bales, including carryover, and by the end of the season the amount of this still unconsumed could very well amount to more than 13,000,000 bales. American production this year is put at 13,700,000 bales, and that outside the United States at 17,000,000 bales.



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RUBBER SLUG CUTTER

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In one 8-hour shift, the machine cut 14,000 pounds of extruded stock !

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STATISTICS

of interest to the rubber industry

Natural Rubber in the United States

(Including Latex and Guayule)

(All Quantities in Long Tons)

Year	New Supply	Consumption	Re-Exports	Stocks On Hand at End of Period
1926	417,643	366,200	17,671	72,510
1927	431,246	373,000	27,775	99,282
1928	439,731	437,000	32,159	65,454
1929	565,087	467,400	36,485	118,609
1930	487,628	376,000	30,205	201,000
1931	501,788	355,200	25,609	322,000
1932	414,668	336,700	20,937	379,000
1933	418,902	412,400	20,576	365,000
1934	463,018	462,500	23,856	355,000
1935	467,146	495,500	11,391	303,000
1936	488,145	575,000	12,582	223,000
1937	600,479	543,600	7,902	262,204
1938	411,983	437,031	5,652	231,500
1939	499,473	592,000	13,125	125,800
1940	818,243	648,500	7,060	288,864
1941	1,029,007	775,000	5,376	533,344
1942	282,653	376,791	10,856	422,714
1943	55,329	317,634	20,815	139,594
1944	107,834	144,113	9,665	93,650
1945	135,672	105,429	6,743	118,715
1946	400,687	277,597	4,338	237,467
1947	688,354	562,661	4,101	129,038
1948	735,227	627,332	6,673	141,541
1949	660,792	574,522	6,253	106,619
1950	802,249	720,268	8,644	89,215
1951	733,048	454,015	2,603	76,569
1952	805,997	453,846	3,024	95,260
1953	647,150	553,473	8,376	112,316
1954	596,848	596,285	7,443	104,543
1954:				
Dec.	43,557	55,096	775	102,943
1955:				
Jan.	49,941	56,911	909	101,050
Feb.	50,880	50,997	718	97,189
Mar.	61,250	58,472	691	102,058
Apr.	61,113	53,781	892	101,620
May	61,042	54,746	683	106,650
June	52,762	56,282	682	101,491
July	43,626	46,166	906	105,782
Aug.	.....	48,411	794	109,688

Source: U. S. Department of Commerce.

U. S. Imports of Natural Rubber

Year	Dry — Long Tons	Dry — Declared Value	Latex — Long Tons	Latex — Declared Value	Total Imports
1938	397,640	125,373,864	11,944	4,168,127	409,584
1939	469,946	167,586,780	27,437	10,467,552	497,383
1940	781,202	303,308,823	33,789	14,593,466	814,991
1941	989,498	401,976,317	34,797	15,965,627	1,024,245
1942	266,276	112,537,426	10,646	5,630,667	276,922
1943	50,358	31,369,198	1,890	1,312,202	52,248
1944	103,847	73,908,549	3,091	2,092,211	106,938
1945	134,408	95,814,102	4,773	3,115,853	139,181
1946	376,502	228,796,110	8,421	5,843,085	384,923
1947	691,087	306,951,814	17,542	9,787,722	708,629
1948	702,293	290,849,177	32,745	18,288,223	735,038
1949	630,808	225,343,624	29,743	14,968,650	660,551
1950	747,109	416,222,598	54,401	41,764,486	801,510
1951	677,874	727,343,348	54,963	80,178,309	732,837
1952	756,987	578,179,519	48,228	40,563,116	805,215
1953	571,635	284,909,223	75,511	46,353,333	647,146
1954	522,364	219,098,143	74,483	42,755,029	596,847
1954:					
Dec.	34,668	18,272,151	8,889	6,208,294	43,557
1955:					
Jan.	42,088	22,245,606	7,853	5,473,260	49,941
Feb.	44,770	26,161,643	6,110	4,196,213	50,880
Mar.	53,639	33,482,831	7,611	5,987,304	61,250
Apr.	52,563	33,425,499	8,549	7,235,327	61,112
May	52,192	32,621,824	8,849	6,968,726	61,041
June	45,025	27,959,320	7,736	6,015,080	52,761
July	34,924	21,653,274	8,702	6,855,619	43,626

Source: Bureau of the Census, U. S. Department of Commerce.

World Production of Natural Rubber

(Including Latex)

(Long Tons)

Year	Malaya	Indonesia	Ceylon	Viet Nam & Cambodia	Latin America	Rest of World*	Total*
1943	75,000*	100,000*	105,500	70,370	41,900	72,507	465,000
1944	25,000*	50,000*	98,500	60,419	49,946	77,000	360,000
1945	8,600*	10,000*	97,500	12,000*	47,125	73,570	250,000
1946	403,719	175,000*	94,000	19,975	39,678*	105,080	837,500
1947	646,362	277,951	89,000	38,128	34,928*	172,782	1,260,000
1948	698,189	432,349	95,000	43,935	29,158*	225,557	1,525,000
1949	671,503	432,996	89,500	43,010	27,318*	225,659	1,490,000
1950	694,090	696,472	113,500	48,482	26,902*	280,299	1,860,000
1951	605,346	814,406	105,000	52,136	29,777*	278,262	1,885,000
1952	584,238	750,494	96,500	63,134	35,475*	261,211	1,790,000
1953	574,390	692,164	98,610	74,545	35,318*	250,182	1,725,000
1954	584,435	738,670	93,935	78,024	26,833*	280,112	1,802,500
1955:							
Jan.	55,413	40,719	9,614	5,926	4,906*	22,368	140,000
Feb.	50,526	70,651	4,485	1,973	2,405*	28,878	157,500
Mar.	52,483	47,394	4,892	4,231	2,627*	28,147	140,000
Apr.	44,716	48,198	7,049	4,708	500*	26,823	135,000
May	49,798	47,960	5,440	5,748	500*	16,998	135,000
June	50,474	74,162	5,835	6,168	500	26,037	165,000
July	56,030	53,779	8,457	....	500	17,609	152,500
Aug.	54,354	63,218	9,698	....	500	21,407	155,000

Source: International Rubber Study Group. * Estimated.

World Consumption of Natural and Synthetic Rubber

(Including Latex)

(Long Tons)

Year	United States	United Kingdom	Canada	Europe*	Rest of World*	Total*
1943	488,525	66,730	32,896	150,000	156,104	907,500
1944	710,783	86,977	34,310	132,500	160,690	1,125,000
1945	799,009	91,047	41,836	87,500	108,164	1,127,500
1946	1,039,296	126,770	39,196	145,000	115,804	1,467,500
1947	1,122,327	156,399	61,452	242,500	153,548	1,735,000
1948	1,069,404	196,286	62,121	392,000	182,379	1,902,500
1949	988,903	186,622	56,362	446,500	207,388	1,887,500
1950	1,258,557	222,425	68,695	448,500	287,055	2,285,000
1951	1,214,298	238,101	70,809	476,500	314,941	2,312,500
1952	1,261,413	202,179	67,099	550,000	254,901	2,335,000
1953	1,338,309	211,453	73,394	521,000	343,606	2,500,000
1954	1,233,012	247,612	71,656	544,250	408,094	2,505,000
1954:						
Dec.	119,226	21,238	6,236	49,250	32,764	227,500
1955:						
Jan.	125,290	24,645	6,128	46,250	36,122	237,500
Feb.	118,611	21,238	6,937	43,500	28,563	220,000
Mar.	135,590	22,648	7,508	48,000	36,742	250,000
Apr.	125,059	24,872	6,829	51,750	34,421	242,500
May	130,475	21,903	7,107	49,500	37,643	247,500
June	136,464	19,852	7,619	52,750	40,381	255,000
July	109,498	19,710	5,443	.....	.....	217,500
Aug.	121,496	17,538	.....	.....	.....	225,000

Source: International Rubber Study Group. * Estimated.

U. S. Gross Imports of Balata, Jelutong, Gutta-Percha, etc.

(All Quantities in Long Tons)

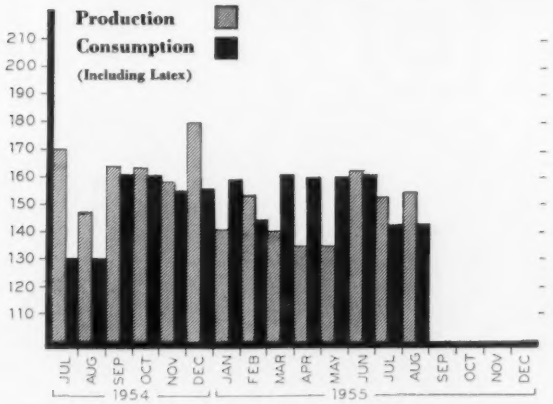
Year	Balata — Tons	Balata — Value	Jelutong — Tons	Jelutong — Value	Gutta-Percha & Other Guttas — Tons	Gutta-Percha & Other Guttas — Value
1944	1,012	660,805	88	45,578	10	4,999
1945	1,361	907,253	....	.....	36	21,970
1946	2,281	2,233,065	304	256,169	423	458,064
1947	1,982	2,276,531	2,878	1,496,887	392	779,591
1948	1,195	805,078	3,401	2,377,765	423	542,788
1949	1,391	814,554	1,043	834,978	197	189,021
1950	2,117	1,589,885	1,789	1,515,162	541	745,418
1951	2,452	1,973,271	1,669	2,608,359	383	430,539
1952	988	762,994	1,636	2,094,983	282	385,890
1953	1,619	866,248	1,027	1,166,837	235	303,116
1954	949	504,065	2,196	2,624,926	417	511,055
1954:						
Sept.	107	43,193	313	335,832	37	32,492
Oct.	85	49,323	263	328,656	14	24,116
Nov.	108	76,392	156	188,426	27	49,170
Dec.	83	49,271	145	169,503	17	20,087
1955:						
Jan.	41	48,160	205	247,639	12	24,628
Feb.	28	24,321	129	102,572	37	36,566
Mar.	72	48,365	184	205,480	36	48,134
Apr.	83	58,184	113	122,952	36	32,463
May	44	35,402	121	119,278	52	48,021
June	93	61,821	119	115,511	46	50,901
July	105	66,771	146	163,189	17	16,588

Source: U. S. Department of Commerce.

STATISTICS at a glance

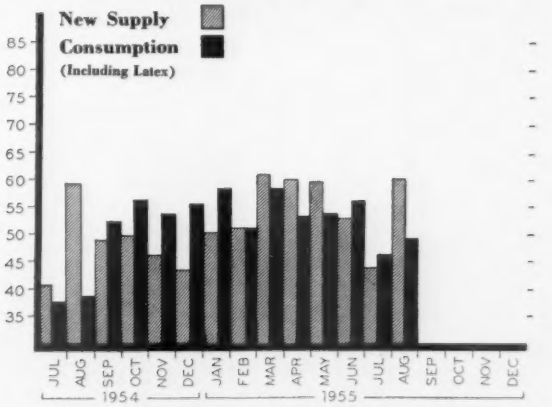
NATURAL RUBBER—WORLD

(thousands of long tons)



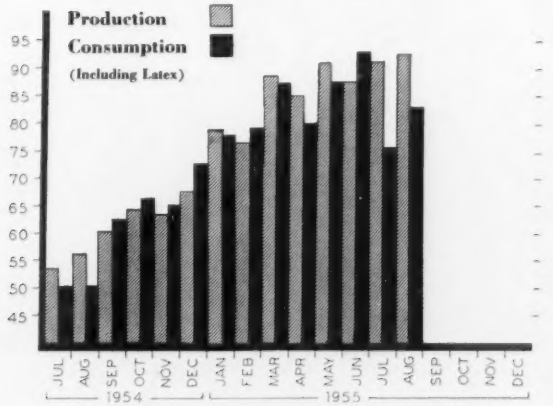
NATURAL RUBBER—UNITED STATES

(thousands of long tons)



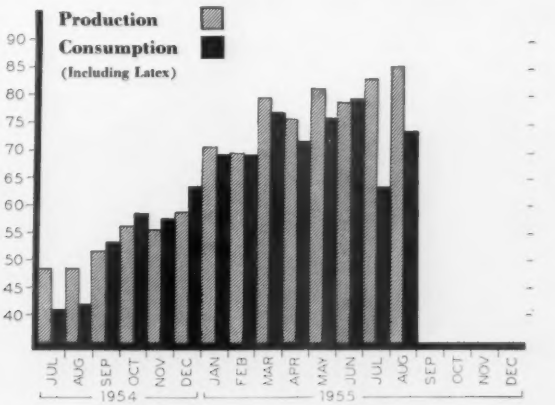
SYNTHETIC RUBBER—WORLD

(thousands of long tons)



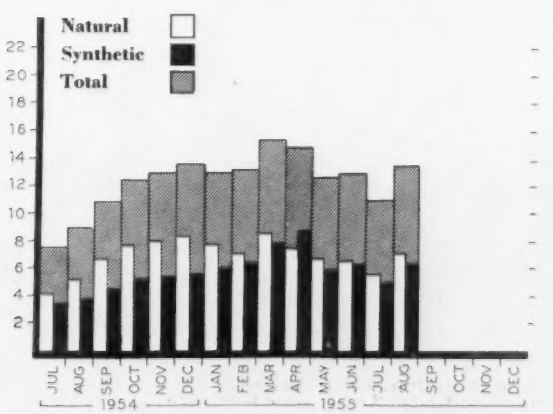
SYNTHETIC RUBBER—UNITED STATES

(thousands of long tons)



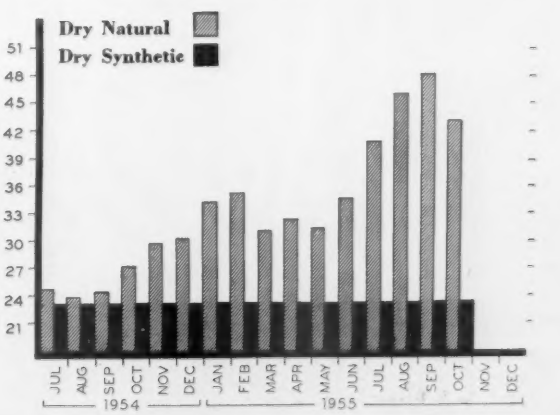
LATEX CONSUMPTION IN THE U. S.

(thousands of long tons)



PRICES—NATURAL AND SYNTHETIC

(cents per pound)



Synthetic Rubber in the United States

(All Quantities in Long Tons)

New Supply

Year	GR-S	Neoprene	Butyl	N-Type	Total
1946	613,408	47,766	80,823	5,738	747,735
1947	408,858	31,495	62,824	6,618	509,795
1948	405,492	34,848	56,662	7,012	504,014
1949	310,539	35,215	54,046	11,072	410,932
1950	378,887	50,067	60,915	12,037	501,906
1951	704,529	58,907	76,475	15,333	855,244
1952	654,854	65,745	81,630	16,228	818,447
1953	680,728	80,495	79,801	20,198	861,222
1954	490,405	69,150	58,802	21,396	639,753
1954:					
Dec.	47,356	6,206	4,666	2,068	60,296
1955:					
Jan.	59,043	6,983	3,220	2,099	71,345
Feb.	56,442	6,910	3,727	1,729	68,808
Mar.	65,169	7,132	5,256	2,158	79,715
Apr.	60,826	8,359	5,148	2,534	76,867
May	66,827	7,852	5,115	3,122	82,916
June	65,367	5,919	3,872	3,850	79,008
July	66,503	6,904	5,395	3,700	82,502
Aug.	68,770	8,511	4,203	3,244	84,728

Consumption

1946	632,126	44,357	79,228	5,988	761,699
1947	448,589	37,703	68,838	4,536	559,666
1948	345,313	32,118	58,870	5,771	442,072
1949	299,420	31,753	50,855	8,827	414,381
1950	416,230	43,781	66,348	11,930	538,289
1951	626,444	48,887	70,500	13,066	758,897
1952	666,420	55,522	71,229	13,866	807,037
1953	624,181	65,900	77,826	16,929	784,836
1954	500,345	57,203	61,464	17,715	636,727
1954:					
Dec.	52,475	5,434	4,583	1,638	64,130
1955:					
Jan.	56,371	5,676	4,478	1,854	68,379
Feb.	56,000	5,476	4,312	1,826	67,614
Mar.	63,737	6,423	4,839	2,119	77,118
Apr.	59,746	5,884	4,321	2,095	72,046
May	62,858	6,143	4,455	1,953	75,409
June	65,892	6,320	4,704	2,566	79,482
July	53,088	4,294	3,894	2,056	63,332
Aug.	59,338	6,398	4,326	3,023	73,085

Exports

1946	68,763	2,642	495	797	72,697
1947	7,951	2,617	62	755	11,385
1948	1,093	2,875	21	885	4,874
1949	1,401	3,330	178	1,574	6,483
1950	900	4,826	31	1,895	7,652
1951	483	6,825	216	1,725	9,249
1952	9,467	9,813	126	2,695	22,101
1953	7,692	11,494	237	3,245	22,668
1954	11,069	12,062	2,831	4,155	30,117
1954:					
Dec.	994	1,088	140	396	2,618
1955:					
Jan.	1,381	1,046	716	194	3,337
Feb.	1,331	1,049	370	259	3,009
Mar.	2,162	1,287	672	236	4,357
Apr.	1,807	1,636	1,562	506	5,511
May	3,500	1,430	376	357	5,663
June	6,030	1,541	726	389	8,686
July	5,212	1,275	870	472	7,829
Aug.	5,621	1,408	798	431	8,258

Stocks

1946	81,486	10,470	19,478	3,755	115,186
1947	40,606	5,237	13,184	3,339	62,366
1948	96,282	5,072	10,995	2,762	115,111
1949	77,731	4,654	12,224	3,433	98,042
1950	36,942	5,733	7,243	2,840	52,758
1951	105,271	8,379	12,481	3,821	129,912
1952	83,861	8,535	22,716	3,875	118,987
1953	135,153	11,480	24,866	4,346	175,845
1954	115,499	11,349	19,267	4,280	150,395
1954:					
Dec.	115,499	11,349	19,247	4,080	150,175
1955:					
Jan.	114,976	11,598	17,079	4,160	147,813
Feb.	111,796	10,555	15,424	3,885	141,660
Mar.	113,594	11,037	15,096	3,786	143,513
Apr.	112,156	10,863	14,813	3,586	140,788
May	114,216	10,283	14,449	4,033	142,981
June	108,679	9,755	13,053	3,803	135,320
July	115,116	11,213	13,288	5,528	145,445
Aug.	113,534	11,230	12,398	5,298	142,460

Source: U. S. Department of Commerce

Natural and Synthetic Rubber Latex in the United States

(All Quantities in Long Tons)

New Supply

Year	Natural	GR-S	Neoprene	N-Type	Total Synthetic	Grand Total
1943	1,890	194	1,512	.....	1,706	3,596
1944	3,090	6,580	4,683	.....	11,263	14,353
1945	4,768	15,176	7,077	.....	22,253	27,021
1946	8,012	24,810	13,595	.....	38,405	46,417
1947	17,675	22,474	6,089	.....	28,563	46,238
1948	32,630	21,494	5,022	.....	26,516	59,146
1949	29,974	21,357	3,651	.....	25,008	54,982
1950	54,401	31,339	5,725	.....	37,064	91,465
1951	54,963	32,972	6,866	2,948	42,786	97,749
1952	48,228	42,273	7,598	4,164	54,035	102,263
1953	75,511	48,112	9,026	5,844	62,982	138,493
1954	74,483	48,379	8,214	6,866	63,459	137,942
1954:						
Aug.	7,571	1,995	756	682	3,433	11,004
Sept.	6,480	4,190	676	581	5,447	11,927
Oct.	7,210	5,190	742	780	6,712	13,922
Nov.	6,335	5,115	717	558	6,390	12,725
Dec.	8,888	5,238	729	624	6,591	15,479
1955:						
Jan.	7,853	6,199	617	624	7,440	15,293
Feb.	6,110	5,634	797	641	7,072	13,182
Mar.	7,611	7,078	854	672	8,604	16,215
Apr.	8,550	5,680	975	1,022	7,677	16,527
May	8,849	5,292	880	808	6,980	15,829
June	7,736	4,688	905	1,434	7,027	14,763
July	8,702	4,753	641	993	6,387	15,089
Aug.	.....	4,456	881	917	6,254	.....

Consumption[1]

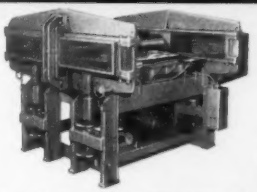
1943	9,578	150	1,400	....	1,550	11,128
1944	6,085	6,000	4,400	....	10,400	16,485
1945	3,886	14,500	6,800	....	21,300	25,186
1946	5,714	23,500	13,000	....	36,500	42,214
1947	13,909	22,500	6,500	....	29,000	42,909
1948	28,489	21,500	5,250	....	26,750	55,239
1949	36,117	21,500	3,750	....	25,250	61,367
1950	56,138	31,000	5,500	....	36,500	92,638
1951	46,750	31,031	6,279	2,628	39,938	86,688
1952	53,567	40,562	7,368	3,093	51,023	104,590
1953	67,375	46,473	7,981	3,654	58,108	125,483
1954	75,931	44,173	7,251	4,507	55,931	131,862
1954:						
Aug.	5,228	2,834	561	351	3,746	8,974
Sept.	6,903	3,599	628	379	4,606	11,509
Oct.	7,527	4,347	612	376	5,335	12,862
Nov.	7,622	4,411	631	411	5,453	13,075
Dec.	7,671	4,575	600	460	5,635	13,306
1955:						
Jan.	7,355	4,537	661	506	5,704	13,059
Feb.	7,066	4,881	689	501	6,071	13,137
Mar.	8,415	5,861	828	509	7,198	15,613
Apr.	7,732	5,209	748	601	6,558	14,290
May	6,643	4,728	768	493	5,989	12,632
June	6,589	4,885	722	587	6,194	12,783
July	5,469	3,830	535	626	4,991	10,460
Aug.	6,878	4,552	813	860	6,225	13,103

Stocks at End of Period

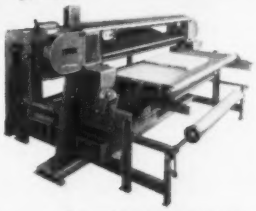
1943	5,638	....	....	....	....	5,638
1944	2,443	....	....	....	....	2,443
1945	3,121	....	....	....	....	3,121
1946	4,865	....	....	....	....	4,865
1947	5,033	....	....	....	....	5,033
1948	11,235	....	....	....	....	11,235
1949	5,063	....	....	....	....	5,063
1950	4,927	....	....	....	....	4,927
1951	4,752	3,727	1,245	532	5,504	10,256
1952	6,201	5,040	1,019	902	6,961	13,162
1953	13,532	4,794	1,117	721	6,632	20,164
1954	11,133	5,134	1,087	811	7,032	18,165
1954:						
Aug.	12,009	4,220	1,019	993	6,232	18,241
Sept.	11,546	4,504	984	908	6,396	17,942
Oct.	10,952	4,745	1,001	950	6,696	17,648
Nov.	9,759	4,943	1,055	939	6,937	16,696
Dec.	9,933	5,134	1,087	811	7,032	16,965
1955:						
Jan.	9,684	5,861	1,067	812	7,740	17,424
Feb.	8,619	5,753	879	663	7,295	15,914
Mar.	7,820	6,940	909	637	8,486	16,306
Apr.	6,790	7,098	786	703	8,587	15,377
May	8,854	7,021	767	817	8,605	17,459
June	9,788	6,645	817	883	8,335	18,123
July	11,934	6,950	850	1,397	9,197	21,131
Aug.	11,970	6,125	810	1,269	8,204	20,174

Source: U. S. Department of Commerce.
Note: (1) GR-S and Neoprene consumption estimated through 1950.

Campbell SPECIAL MACHINES



Campbell ROLLER DIE CUTTER, standard and heavy duty models. Die cuts many materials, trims molded rubber goods.



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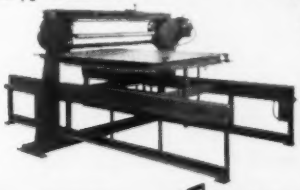

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Rubber Industry Employment Earnings and Hours

All Rubber Products

Mo.	1954 Production Workers (thousands)	1954 Average Weekly Earnings	1954 Average Weekly Hours	1954 Average Hourly Earnings	1955 Production Workers (thousands)	1955 Average Weekly Earnings	1955 Average Weekly Hours	1955 Average Hourly Earnings
Jan.	203.8	$74.69	38.7	$1.93	208.5	$83.84	41.3	$2.03
Feb.	200.5	75.08	38.9	1.93	209.4	84.25	41.3	2.04
Mar.	196.6	74.31	38.5	1.93	211.6	83.64	41.0	2.04
Apr.	192.4	74.88	38.8	1.93	210.9	86.53	41.8	2.07
May	194.2	77.81	39.7	1.96	215.7	87.36	42.0	2.08
June	195.6	79.60	40.2	1.98	219.0	88.83	42.3	2.10
July	171.0	76.44	39.4	1.94	216.9	86.52	41.2	2.10
Aug.	174.9	75.85	39.1	1.94	219.0	....	....	....
Sept.	196.3	77.42	39.3	1.97	....	....	....	....
Oct.	201.6	81.20	40.4	2.01	....	....	....	....
Nov.	202.1	83.02	41.1	2.02	....	....	....	....
Dec.	206.8	84.85	41.8	2.03	....	....	....	....
Tires and Tubes								
Jan.	84.5	82.88	37.5	2.21	85.3	97.41	41.1	2.37
Feb.	82.9	83.03	37.4	2.21	86.5	96.46	40.7	2.37
Mar.	81.9	80.99	36.6	2.21	87.4	95.51	40.3	2.37
Apr.	80.4	84.14	37.9	2.22	88.6	102.18	42.4	2.41
May	81.1	88.65	39.4	2.25	89.8	101.88	42.1	2.42
June	82.2	92.06	40.2	2.29	91.0	105.60	43.1	2.45
July	65.2	87.01	38.5	2.26	91.5	103.82	42.9	2.42
Aug.	65.9	85.65	37.4	2.29	....	....	....	....
Sept.	82.6	86.18	38.3	2.25	....	....	....	....
Oct.	83.9	90.39	39.3	2.30	....	....	....	....
Nov.	81.2	94.54	40.4	2.34	....	....	....	....
Dec.	84.5	98.18	41.6	2.36	....	....	....	....
Rubber Footwear								
Jan.	21.5	62.98	38.4	1.64	22.1	68.97	40.1	1.72
Feb.	20.5	65.57	39.5	1.66	21.5	69.72	40.3	1.73
Mar.	19.6	65.51	39.7	1.65	21.5	69.72	40.3	1.73
Apr.	19.2	63.58	38.3	1.66	21.5	70.82	40.7	1.74
May	19.8	65.46	39.2	1.67	21.3	70.07	40.5	1.73
June	19.8	67.30	40.3	1.67	21.6	71.34	41.0	1.74
July	20.1	68.45	40.5	1.69	21.8	71.93	41.1	1.75
Aug.	20.5	66.40	40.0	1.66	....	....	....	....
Sept.	21.0	66.08	39.1	1.69	....	....	....	....
Oct.	21.9	71.34	41.0	1.74	....	....	....	....
Nov.	22.3	71.51	41.1	1.74	....	....	....	....
Dec.	22.3	71.69	41.2	1.74	....	....	....	....
All Other Rubber Products								
Jan.	97.8	70.62	39.9	1.77	101.1	76.08	41.8	1.82
Feb.	97.1	70.40	40.0	1.76	101.4	76.86	42.0	1.83
Mar.	95.1	70.22	39.9	1.76	102.7	76.49	41.8	1.83
Apr.	92.8	69.30	39.6	1.75	101.0	76.54	41.6	1.84
May	93.3	70.98	40.1	1.77	104.6	78.68	42.3	1.86
June	93.6	70.98	40.1	1.77	106.4	77.93	41.9	1.86
July	85.7	70.62	39.9	1.77	103.6	73.84	39.7	1.86
Aug.	88.5	77.15	40.2	1.77	....	....	....	....
Sept.	92.7	72.36	40.2	1.80	....	....	....	....
Oct.	95.8	74.98	41.2	1.82	....	....	....	....
Nov.	98.6	75.71	41.6	1.82	....	....	....	....
Dec.	100.0	76.44	42.0	1.82	....	....	....	....

Source: U. S. Department of Labor.

Note: Data are based upon reports from cooperating establishments covering both full and part-time employees who work during, or received pay for, any part of the pay period ending nearest the 15th of the month. These employment series have been adjusted to first quarter 1954 benchmark levels indicated by data from government social insurance programs. Hours and earnings data pertain only to production and related workers.

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market—in Cents)

Average Monthly Price Per Pound

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	36.09	33.37	31.89	45.04	42.96	33.24	34.15	35.07
Feb.	33.63	33.41	32.79	(a)	41.64	33.76	35.00	35.04
Mar.	35.04	33.44	32.65	46.06	41.70	34.10	35.23	34.33
Apr.	38.10	33.84	33.23	46.06	41.79	33.85	35.22	34.23
May	38.57	33.73	33.64	46.06	39.98	34.30	35.34	34.80
June	38.12	33.56	34.61	46.06	41.31	34.11	35.17	34.83
July	34.89	32.99	38.11	46.21	40.37	34.20	35.37	34.61
Aug.	32.23	32.06	38.53	35.93	40.42	33.82	35.19	34.53
Sept.	31.92	30.94	41.62	36.20	39.75	33.69	35.46	33.85
Oct.	32.01	30.32	40.66	38.13	37.52	33.53	35.24	33.93
Nov.	32.15	30.52	43.11	42.70	35.59	33.60	34.80	....
Dec.	32.90	31.08	43.37	43.32	33.76	33.52	35.03	....
Average for Year	34.64	32.44	37.05	42.43	39.71	33.81	35.10	....

Note: The Government established a ceiling price of 45.76c for spot cotton on March 3, 1951. (a) Trading suspended during February.

Production Index for the Rubber Industry

(1947-1949 = 100)

(Based on man-hours)

	1953	1954	1955		1953	1954	1955
Jan.	132	114	145	July	114	85	121
Feb.	140	114	144	Aug.	122	94	132
Mar.	143	118	146	Sept.	122	118	...
Apr.	140	116	147	Oct.	127	132	...
May	137	118	145	Nov.	120	124	...
June	131	121	151	Dec.	111	128	...

Sales by the Rubber Industry

(in Millions of Dollars*)

	1953	1954	1955		1953	1954	1955
Jan.	434	361	424	July	460	393	471
Feb.	442	360	440	Aug.	424	352	...
Mar.	452	378	466	Sept.	414	346	...
Apr.	443	382	445	Oct.	405	346	...
May	443	378	465	Nov.	360	404	...
June	442	385	465	Dec.	372	417	...

Rubber Manufacturers' Inventories

(in Millions of Dollars*)

	1953	1954	1955		1953	1954	1955
Jan.	839	835	790	July	901	787	853
Feb.	839	848	782	Aug.	888	754	...
Mar.	854	844	805	Sept.	899	799	...
Apr.	857	813	784	Oct.	878	835	...
May	868	798	810	Nov.	865	811	...
June	893	817	850	Dec.	859	821	...

Source: U. S. Department of Commerce.
Notes: * Adjusted for seasonal variation.

No. 1 R.S.S.—Annual Average Prices

(New York Market—Cents per Pound)

Year	High	Low	Avg.	Year	High	Low	Avg.
1913	113	59	82.04	1934	15⅞	8¾	12.92
1914	93	56	65.33	1935	13¾	10½	12.37
1915	79	58½	65.85	1936	23	13½	16.41
1916	102	55	72.50	1937	26¼	14	19.39
1917	90	52	72.23	1938	17 1/16	10¼	14.64
1918	70	40	60.15	1939	24	14⅛	17.57
1919	57	38½	48.70	1940	24	18⅛	20.10
1920	56½	16	36.30	1941	24⅞	19⅛	22.40
1921	21¼	11½	16.36	1942	22½	22½	22.50
1922	28⅛	13⅝	17.50	1943	22½	22½	22.50
1923	37⅛	24¾	29.45	1944	22½	22½	22.50
1924	40⅞	17⅝	26.20	1945	22½	22½	22.50
1925	121	34⅜	72.46	1946	22½	22½	22.50
1926	88½	36¾	48.50	1947	25	14	20.00
1927	41¾	33	37.72	1948	25	18	21.99
1928	41¾	17	22.48	1949	19¾	15⅞	17.57
1929	26⅞	15½	20.55	1950	86	18	41.10
1930	16½	7½	11.98	1951	76	52	(a)
1931	8⅝	4¼	6.17	1952*	33	26½	29.15
1932	4¾	2½	3.49	1953	31⅞	19⅞	24.21
1933	9⅞	2⅞	5.96	1954	34½	19½	23.61

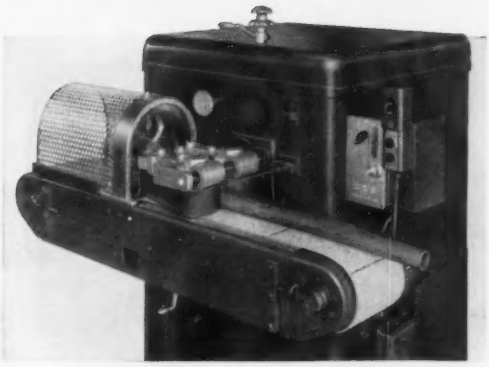
Note: Price was fixed by Government on August 6, 1941, at 22½c a pound for non-war uses. Free trading was resumed May 1, 1947. (a) Free trading suspended March 31, 1951. GSA selling price ranged between 52 and 66c during balance of year. * Free trading was resumed on July 1, 1952; figures represent only July through December, 1952.

No. 1 R.S.S.—Monthly Average Prices

(New York Market—Cents per pound)

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	21.83	19.23	18.33	71.21	....	29.40	20.22	33.92
Feb.	20.42	18.49	19.40	73.61	....	27.57	19.98	34.90
Mar.	20.33	19.08	19.86	72.05	....	26.59	20.16	31.08
Apr.	22.87	18.53	23.51	....	....	24.66	22.06	31.75
May	23.39	17.92	28.07	....	....	25.52	21.96	31.35
June	22.80	16.36	30.92	....	....	24.42	23.01	34.74
July	24.24	16.45	39.10	....	30.52	23.64	24.12	40.84
Aug.	23.63	16.60	51.63	....	29.36	23.36	23.26	45.85
Sept.	22.81	17.58	55.98	....	27.42	23.06	23.99	48.27
Oct.	22.13	16.31	62.19	....	27.26	20.82	26.57	43.81
Nov.	20.52	16.70	73.05	....	29.25	20.58	28.07	....
Dec.	18.86	17.53	71.20	....	31.26	20.92	29.88	....
Average for Year	21.99	17.57	41.10	(a)	29.15	24.21	23.61	....

Note: (a) Free trading suspended March 31, 1951, and resumed on July 1, 1952.



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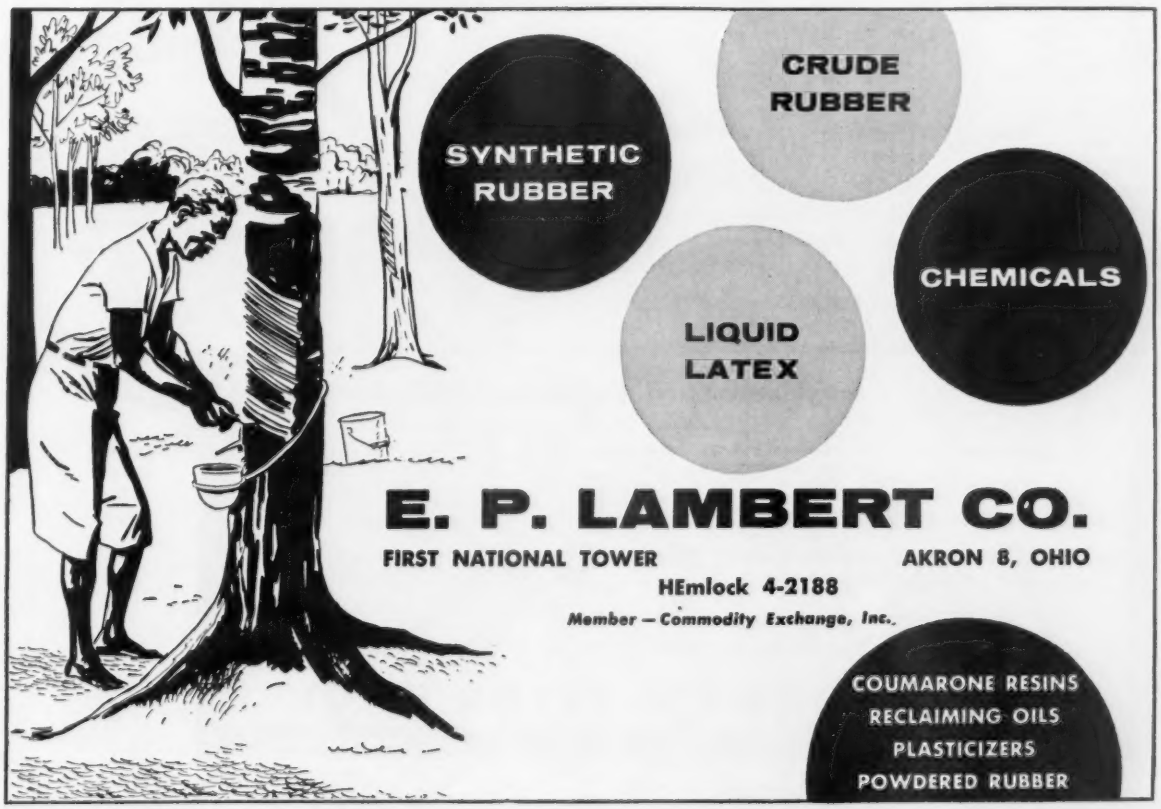

Automotive Pneumatic Casings

(Thousands of Units)

	Shipments					
	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1945 (total)	5,984	36,479	504	42,967	44,524	3,077
Passenger Car.	1,115	25,463	222	26,800	28,200	2,214
Truck and Bus	4,869	11,016	282	16,167	16,324	863
1946 (total)	15,310	65,490	1,512	82,312	82,298	2,448
Passenger Car.	11,086	54,684	653	66,423	66,466	1,763
Truck and Bus	4,224	10,806	859	15,889	15,832	685
1947 (total)	25,056	62,871	3,256	91,183	95,550	6,949
Passenger Car.	19,644	52,857	1,608	74,109	77,795	5,444
Truck and Bus	5,412	10,014	1,648	17,074	17,755	1,505
1948 (total)	26,845	49,148	1,787	77,781	81,314	10,698
Passenger Car.	21,589	41,295	656	63,540	66,738	8,773
Truck and Bus	5,256	7,853	1,132	14,241	14,576	1,925
1949 (total)	31,584	43,466	1,467	76,517	76,369	10,638
Passenger Car.	28,129	36,440	509	65,077	65,140	8,904
Truck and Bus	3,456	7,026	958	11,440	11,228	1,734
1950 (total)	41,349	56,808	1,430	99,587	92,754	3,794
Passenger Car.	36,678	47,103	642	84,423	78,598	3,050
Truck and Bus	4,671	9,705	788	15,164	14,156	743
1951 (total)	32,153	44,612	1,677	78,442	83,405	8,765
Passenger Car.	26,729	34,226	723	61,678	65,546	6,973
Truck and Bus	5,424	10,386	954	16,764	17,859	1,791
1952 (total)	29,484	54,342	1,520	85,346	90,411	14,110
Passenger Car.	24,106	45,458	741	70,305	74,341	11,251
Truck and Bus	5,378	8,884	779	15,041	16,070	2,859
1953 (total)	37,949	55,124	1,543	94,617	96,150	15,720
Passenger Car.	33,106	45,798	809	79,713	81,455	13,044
Truck and Bus	4,843	9,326	734	14,904	14,696	2,676
1954 (total)	33,333	55,155	1,753	90,241	89,141	14,762
Passenger Car.	29,741	47,044	928	77,713	76,794	12,217
Truck and Bus	3,591	8,111	826	12,528	12,347	2,545
1954:						
Dec. (total)	3,707	3,470	169	7,346	8,444	14,774
Passenger Car.	3,383	2,844	88	6,315	7,215	12,228
Truck and Bus	325	625	81	1,031	1,229	2,546
1955:						
Jan. (total)	3,785	4,967	159	8,911	9,040	14,949
Passenger Car.	3,481	4,139	79	7,699	7,797	12,363
Truck and Bus	303	827	81	1,211	1,243	2,586
Feb. (total)	3,833	4,281	157	8,272	8,745	15,368
Passenger Car.	3,540	3,551	83	7,174	7,549	12,687
Truck and Bus	294	730	74	1,098	1,196	2,681
Mar. (total)	4,780	4,926	201	9,907	10,083	15,609
Passenger Car.	4,326	4,254	104	8,685	8,810	12,875
Truck and Bus	454	672	96	1,222	1,273	2,734
Apr. (total)	4,457	5,315	165	9,937	9,153	14,890
Passenger Car.	3,967	4,677	89	8,733	8,000	12,197
Truck and Bus	489	639	76	1,204	1,153	2,692
May (total)	4,352	5,361	152	9,865	9,949	14,936
Passenger Car.	3,871	4,705	87	8,663	8,742	12,235
Truck and Bus	481	656	65	1,202	1,208	2,701
June (total)	3,931	6,129	174	10,234	10,703	15,460
Passenger Car.	3,482	5,399	97	8,979	9,383	12,698
Truck and Bus	449	730	76	1,255	1,320	2,763
July (total)	3,890	5,711	128	9,729	9,027	14,684
Passenger Car.	3,461	4,802	76	8,339	7,893	12,199
Truck and Bus	429	909	51	1,389	1,134	2,485
Aug. (total)	3,362	5,980	119	9,462	8,717	13,908
Passenger Car.	2,984	5,058	60	8,103	7,585	11,636
Truck and Bus	378	922	59	1,359	1,132	2,272
Sept. (total)	3,142	5,170	140	8,453	9,125	14,674
Passenger Car.	2,749	4,366	74	7,189	7,882	12,407
Truck and Bus	393	804	66	1,264	1,242	2,267

Source: The Rubber Manufacturers Association, Inc.

Automobile Production in U. S.

(Civilian Production Only)

Year	Passenger Cars	Trucks	Total	Year	Passenger Cars	Trucks	Total
1935	3,252,244	694,690	3,946,934	1945	83,792	313,643	397,435
1936	3,669,528	781,862	4,451,390	1946	2,148,699	930,760	3,079,459
1937	3,915,889	892,382	4,808,271	1947	3,558,178	1,220,634	4,778,812
1938	2,000,985	485,852	2,486,837	1948	3,909,270	1,363,856	5,273,126
1939	2,866,796	704,308	3,571,104	1949	5,108,841	1,123,736	6,232,577
1940	3,692,328	721,637	4,413,965	1950	6,665,836	1,332,263	7,998,099
1941	3,744,500	875,381	4,619,681	1951	5,337,729	1,420,432	6,758,161
1942	220,814	133,083	353,897	1952	4,320,794	1,212,790	5,533,584
1943	0	4,501	4,501	1953	6,121,787	1,202,196	7,323,983
1944	0	124,819	124,819	1954	5,558,897	1,038,045	6,596,942
1954:							
Jan.	454,562	96,167	550,729	July	451,663	78,507	530,170
Feb.	446,676	87,141	533,817	Aug.	445,306	75,835	521,141
Mar.	531,529	101,177	632,706	Sept.	300,998	68,618	369,616
Apr.	534,667	96,723	631,390	Oct.	221,195	66,138	287,160
May	497,062	91,226	588,288	Nov.	498,248	89,232	587,480
June	507,055	91,470	598,525	Dec.	669,936	95,811	765,747
1955:							
Jan.	635,513	89,676	725,189	July	658,736	109,589	768,325
Feb.	677,705	67,061	744,766	Aug.	620,610	95,119	715,729
Mar.	791,280	102,992	894,272	Sept.	467,845	91,894	559,739
Apr.	753,434	127,887	881,321	Oct.	.....	.....	.....
May	721,139	127,941	849,080	Nov.	.....	.....	.....
June	647,658	119,215	766,873	Dec.	.....	.....	.....

Source: Automobile Manufacturers Association.
Note: Figures are based on factory sales. Revisions are made from time to time in these figures and the latest issue should be consulted for accuracy.

Automotive Inner Tubes

(Thousands of Units)

	Shipments					
Year	Original Equipment	Replacement	Export	Total	Production	Inventory End of Period
1945	5,988	33,906	411	40,304	41,742	3,627
1946	15,327	59,357	1,424	76,108	77,251	3,820
1947	25,046	46,560	2,483	74,088	79,181	8,059
1948	26,833	40,548	1,119	68,499	70,033	9,641
1949	31,521	31,450	887	63,858	65,114	10,657
1950	41,240	42,671	811	84,723	80,179	....
1951	32,151	32,284	1,071	65,507	67,249	10,094
1952	29,451	32,985	1,014	63,449	65,073	12,036
1953	37,957	36,072	878	74,907	74,425	11,874
1954	25,071	35,576	945	61,593	48,279	9,519
1954:						
Dec.	476	2,019	74	2,569	3,201	9,299
1955:						
Jan.	413	3,629	74	4,116	3,089	8,252
Feb.	352	2,430	80	2,862	2,850	8,244
Mar.	491	2,732	105	3,327	3,234	8,217
Apr.	530	2,635	85	3,250	2,836	7,963
May	531	2,617	84	3,233	3,005	7,735
June	477	3,003	85	3,565	3,136	7,326
July	475	2,915	60	3,450	2,768	6,664
Aug.	394	3,269	70	3,733	2,923	5,917
Sept.	360	2,814	86	3,261	3,169	5,966

Source: The Rubber Manufacturers Association, Inc.

Vinyl and Vinyl Copolymer Resins—Sales

(Thousands of Pounds—Resin Content)

	Polyvinyl Chloride and Copolymer Resins						All Other Vinyl Resins		
	Film	Sheeting	Molding & Extrusion	Textile & Paper Treating	Flooring	Protective Coatings	All Other Uses	Adhesives	All Other Uses	Grand Total
1953	63,691	62,385	129,215	52,353	22,152	22,823	27,790	22,411	77,478	480,299
1954	69,943	56,588	147,284	49,546	34,890	23,676	35,148	26,609	74,090	517,773
1954										
May	4,775	3,840	11,096	3,582	3,256	1,730	2,643	2,578	6,010	39,510
June	5,100	3,003	10,529	3,552	3,554	1,916	2,744	2,500	5,343	38,241
July	5,114	3,441	9,648	3,105	3,356	1,859	2,598	1,951	5,010	36,082
Aug.	7,078	4,522	14,541	4,259	3,931	2,198	3,407	2,444	5,804	48,183
Sept.	5,665	4,340	13,454	3,784	3,797	2,242	3,779	2,379	5,768	45,208
Oct.	5,427	4,227	13,456	3,890	3,688	2,198	3,515	2,215	6,765	45,381
Nov.	6,857	4,132	14,057	4,537	4,099	2,131	3,653	2,235	7,318	49,019
Dec.	6,087	3,963	14,850	4,548	3,796	2,066	3,268	1,867	6,921	47,366
1955										
Jan.	6,291	4,455	15,441	4,512	4,341	2,288	3,600	2,576	7,705	51,208
Feb.	6,606	4,205	15,748	4,829	4,812	2,285	3,801	2,352	7,761	52,400
Mar.	8,052	4,429	16,102	5,402	5,208	2,815	4,336	2,859	8,865	58,068
Apr.	8,227	4,709	15,568	5,779	5,134	2,601	3,271	2,585	8,967	56,842
May	6,985	4,429	14,452	5,240	5,109	2,449	3,547	2,809	9,237	54,256
June	7,103	3,970	14,832	5,036	4,318	2,139	4,403	2,322	8,508	52,630
July	5,925	3,765	11,943	4,304	3,601	2,027	3,540	2,605	6,919	44,631

Source: Chemical Division, U. S. Tariff Commission.

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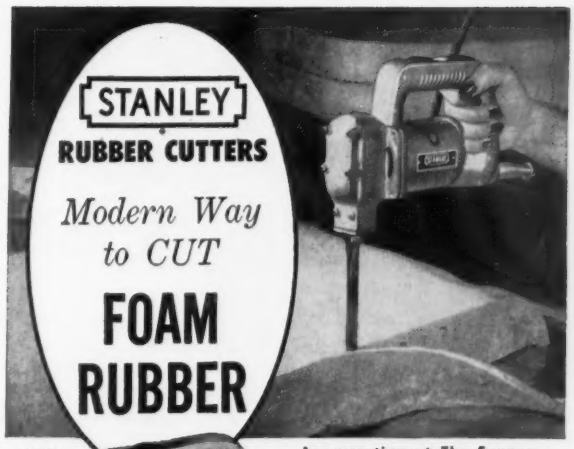

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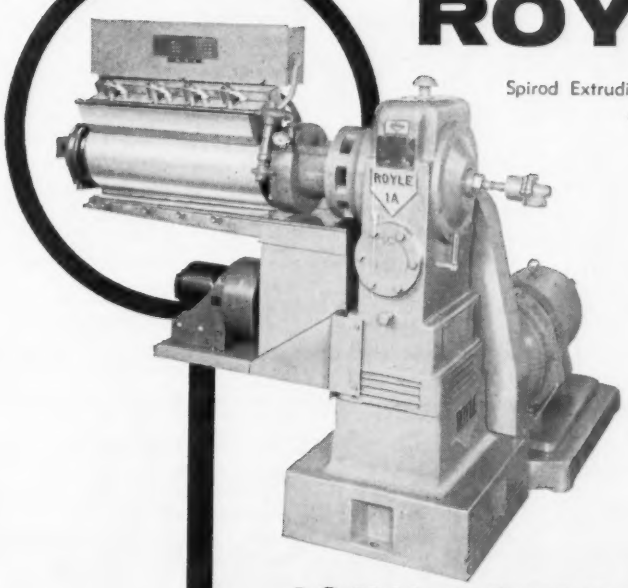

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PATERSON 3, NEW JERSEY

Various Compounding Materials Consumed by the Rubber Industry

Material	1947	1948	1949	1950	1951	1952	1953
Antimony, Primary:							
Short tons	39	41	55	103[c]	19[c]	66	20
% of total	.002	.003	.005	.007	.001	.004	.001
Asphalt: [a]							
Short tons	32,113	19,967	18,050	26,819	21,414	33,288	.....
% of total	0.7	0.4	0.3	0.3	0.3	0.4	.....
Barite (Barytes):							
Short tons	17,000	18,000	14,000	19,000	15,000	14,000	.....
% of total	3.1	2.85	2.53	3.31	2.13	2.0	.....
Carbon Black:							
Short tons	471,790	435,282	383,565	515,184	530,614	537,273	566,797
% of total	94.3	95.5	93.3	92.9	93.9	93.1	94.4
Clay, Kaolin:							
Short tons	166,201	176,965	197,341	263,306	231,331	240,982	.....
% of total	11.5	11.3	13.1	15.0	12.7	13.2	.....
Clay, Fire & Stoneware:							
Short tons	17,970	15,480	27,148	9,500	.....	9,322	.....
% of total	0.2	0.2	0.3	0.1	.....	0.1	.....
Lime:							
Short tons	589	1,154	715	908	1,126	2,000	.....
% of total	0.01	0.02	.0002	.0002	[d]	[d]	.....
Litharge:							
Short tons	2,205	2,835	1,398	3,047	2,641	2,109	.....
% of total	1.3	1.8	1.2	1.7	1.7	1.5	.....
Lithopone:							
Short tons	3,085	4,192	3,245	4,092	3,295	1,523	1,723
% of total	1.9	3.0	4.1	3.9	3.2	2.5	3.3
Mica, Ground:							
Short tons	3,900	4,372	3,856	5,776	6,551	5,126	.....
% of total	6.0	7.0	7.0	8.0	9.0	7.0	.....
Sulfur:							
Short tons	72,800	70,560	59,360	75,000	75,000	75,000	.....
% of total	1.8	1.7	1.5	1.3	1.6	1.6	.....
Talc: [b]							
Short tons	71,840	66,226	53,400	75,900	70,970	64,476	.....
% of total	13.9	13.0	12.0	12.0	11.2	10.9	.....
Zinc Oxide:							
Short tons	82,248	82,895	58,496	82,944	71,507	72,774	78,439
% of total	51.2	54.9	52.5	51.6	48.4	51.2	52.7

Source: U. S. Bureau of Mines.
Notes: (a) Solid and semi-solid products of less than 200 penetration. (b) Includes prophyllite and ground soapstone. (c) Does not include precipitated antimony sulfide as in previous years. (d) Negligible.

Reclaimed Rubber

(Including Natural and Synthetic)

(All Quantities in Long Tons)

Year	New Supply	Consumption: Tons	Consumption: % to Crude [a]	Exports	Stocks On Hand at End of Period
1938	122,400	120,800	27.6	7,403	23,000
1939	186,000	170,000	28.7	12,611	25,250
1940	208,971	190,244	29.3	11,347	32,636
1941	274,202	251,231	32.2	13,851	41,750
1942	286,007 [b]	254,820	64.6	30,405	42,532
1943	304,058 [c]	291,082	59.6	15,678	46,201
1944	260,631 [d]	251,083	35.3	11,800	43,832
1945	243,309	241,036	30.2	13,413	28,155
1946	295,612	275,410	26.5	14,461	33,666
1947	291,395	288,395	24.8	14,556	35,943
1948	266,861	261,113	24.4	11,428	32,630
1949	224,029	226,679	22.5	10,637	28,263
1950	314,008	303,733	24.1	11,740	35,708
1951	366,700	346,121	26.6	14,722	45,082
1952	274,981	280,002	22.2	11,180	30,664
1953	298,336	285,050	21.3	11,597	32,319
1954	258,101	249,049	20.2	10,232	30,746
1954:					
Oct.	23,566	22,098	19.3	808	30,395
Nov.	22,986	22,321	20.2	862	29,451
Dec.	25,790	24,546	20.5	816	30,746
1955:					
Jan.	25,336	25,322	20.2	1,041	29,656
Feb.	25,444	24,333	20.5	1,085	30,125
Mar.	29,574	28,674	21.1	1,088	30,311
Apr.	26,817	26,609	21.3	1,088	30,068
May	27,911	27,652	21.2	1,056	29,528
June	30,451	29,157	21.5	1,128	29,725
July	24,114	22,563	20.6	1,176	29,939
Aug	25,236	25,763	21.2	1,152	27,807

Source: U. S. Department of Commerce.
Notes: (1) These figures are revised from time to time and the latest available issue should be consulted for the most accurate data. (a) Includes natural and synthetic rubber. (b) Includes 893 tons of imports. (c) Includes 67 tons of imports. (d) Includes 21 tons of imports.

Cotton, Rayon and Nylon Tire Fabrics

(In Thousands of Pounds)

	Production: Rayon Tire Cord Not Woven	Production: Rayon Tire Cord Woven	Production: Cotton and Nylon Cord & Fabric [a]	Production: Chafer Fabrics (all fibers)	Production: Total Tire Cord and Fabric	Stocks [b]: Cotton and Nylon Cord & Fabric	Stocks [b]: Rayon Cord and Fabric
1954:							
Jan.-Mar.	17,297	73,068	7,905	13,228	111,499	n.a.	n.a.
Apr.-June	15,257	63,975	12,424	12,867	104,523	6,975	56,497
July-Sept.	12,851	50,136	8,858	9,321	81,166	7,321	47,572
Oct.-Dec.	14,609	76,931	13,081	12,476	117,097	7,654	47,061
Total	60,014	264,110	42,268	47,893	414,285	....	....
1955:							
Jan.-Mar.	20,299	79,191	14,870	12,763	127,123	6,863	44,239
Apr.-June	21,550	80,908	18,527	12,728	133,713	8,874	40,566
July-Sept.	.....	.....	.....	.....	.....	.....	.....
Oct.-Dec.	.....	.....	.....	.....	.....	.....	.....
Total	.....	.....	.....	.....	.....	.....	.....

Source: Bureau of the Census, U. S. Department of Commerce.
Notes: (a) Combined to avoid disclosing figures for individual companies. (b) At end of period.

Gasoline Consumption

(In Thousands of Barrels of 42 Gallons)

	1948	1949	1950	1951	1952	1953	1954	1955
Jan.	61,308	63,125	66,981	80,670	86,863	89,634	89,852	96,397
Feb.	56,487	57,980	53,274	72,864	82,043	86,458	86,206	88,464
Mar.	68,171	73,282	78,780	86,962	87,065	98,158	101,549	105,684
Apr.	72,183	75,318	80,350	87,573	98,653	102,044	103,866	111,116
May	77,186	81,665	89,035	100,266	101,137	105,918	104,418	115,707
June	78,044	83,374	90,174	96,364	99,305	114,703	113,037	120,710
July	81,428	83,129	91,677	100,567	105,307	112,960	112,231	115,653
Aug.	80,351	84,707	94,507	101,453	102,954	109,124	110,223	.....
Sep.	76,159	80,832	86,725	91,891	100,095	106,158	104,706	.....
Oct.	75,164	79,327	89,067	100,209	103,689	106,037	105,607	.....
Nov.	72,560	76,346	82,688	88,581	91,326	99,210	102,393	.....
Dec.	72,162	75,628	81,032	84,551	95,817	100,225	104,258	.....
	871,270	913,713	994,290	1,091,951	1,154,254	1,230,629	1,238,346	.....

Source: U. S. Bureau of Mines.

Rim Production

	1950	1951	1952	1953	1954
Passenger Car	35,096,404	29,145,367	24,936,844	31,318,461	25,952,322
Truck & Bus	6,625,129	6,877,419	5,752,674	5,228,321	4,463,689
Agricultural	2,853,483	3,019,581	2,073,116	1,943,487	1,297,040
Earth Mover	15,602	28,026	31,791	24,685	21,536
Total	44,590,618	39,070,393	32,794,425	38,514,954	31,734,587

	1955: Apr.	May	June	July	Aug.	Sept.
Passenger Car	3,829,339	3,503,467	3,308,984	2,654,118	2,840,789	2,154,381
Truck & Bus	628,480	695,090	716,348	480,443	590,638	512,676
Agricultural	184,851	201,091	148,454	85,798	158,962	114,971
Earth Mover	3,773	2,293	3,051	3,728	2,554	3,601
Total	4,646,443	4,401,941	4,176,837	3,224,087	3,592,952	2,785,629

Source: The Tire & Rim Association, Inc.

Gaps in Your Technical Library?

For complete service on *any* book* on rubber, place your order with the

Book Department

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101 West 31st St., New York 1, N. Y.

** a listing of available books on rubber will be furnished on request.*

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12c per word in light face type—Minimum, $5.00
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Replies to keyed advertisements will be forwarded to advertiser without charge.

Address all replies to Box Numbers care of RUBBER AGE, 101 West 31st St., New York 1, N. Y.

Copy for December, 1955, issue must be received by Wednesday, November 30th.

POSITIONS WANTED

ADHESIVES CHEMIST. Latex experience. Resins. Live in Newark, N. J. Drive automobile. Address Box 492-P, RUBBER AGE.

PRODUCTION—DEVELOPMENT MANAGER. 18 years of practical and technical experience in all phases of molded and lathe cut work. Wish to relocate and will furnish references. Address Box 496-P, RUBBER AGE.

LATEX CHEMIST: production or development. 14 years experience. Dipping specialist. Coagulants. Resident New York-New Jersey area. Willing to relocate. Address Box 493-P, RUBBER AGE.

PRODUCTION MANAGER, now so employed, desires change. Broad practical technical experience in all phases of manufacture for mechanical rubbers, chemically blown sponge, cements, and some plastics. 21 years of experience. Address Box 502-P, RUBBER AGE.

LATEX CHEMIST, knowledge of plastisols, desires technical sales or production supervisory position. Address Box 494-P, RUBBER AGE.

LATEX FOAM CHEMIST, BS—1950. Five years experience compounding and control of various types latex foam rubber. A responsible position with a progressive organization desired. Resumé on request. Address Box 506-P, RUBBER AGE.

FOAM RUBBER EXECUTIVE, Chemical Engineer with many years background in compounding, manufacturing control, costs, equipment and product design, and plant management. Am equipped by experience and temperament to take complete charge of any operation—molded goods or coatings on fabric. Address Box 508-P, RUBBER AGE.

HELP WANTED

RUBBER CHEMISTS—Degree in chemistry or chemical engineering. Up to five years' experience in rubber and polymer orocessing, development or production. Progressive company, well-equipped laboratory, permanent position with opportunity for advancement in expanding operation. Write giving age, experience and education. Replies held confidential. Box 369, ERIE, PENNSYLVANIA.

CHIEF RUBBER CHEMIST to take charge of our mechanical rubber goods compounding operation. Will report directly to our Technical Director and supervise the activities of our laboratory personnel. Salary open. Replies will be confidential. Contact: Personnel Manager, THE SUN RUBBER COMPANY, Barberton, Ohio.

INDUSTRY MANAGER for the sales and application of measurement and control equipment to the rubber industry. An engineer with sales and sales management experience with a capital equipment supplier for the industry. Exceptional opportunity with manufacturer of ACCU-RAY. Send resumé. INDUSTRIAL NUCLEONICS CORPORATION, 1205 Chesapeake Avenue, Columbus 12, Ohio.

CHEMIST OR CHEMICAL ENGINEER: Experienced in formulation and processing of vinyl organosols and plastisols for fabric coating. Practical factory experience in all phases of processing desirable. Give full particulars, including education, experience and salary requirements. Address Box 489-W, RUBBER AGE.

CHEMIST — CHEMICAL ENGINEERS
"Positions with the better firms"
An active, confidential service!
Interview at your convenience!
"Many Junior Positions"
Call, write, or wire:—GLADYS HUNTING (Consultant)
DRAKE PERSONNEL, INC.
220 So. State St., Room 628, Chicago 2, Ill.
HArrison 7-8600

HELP WANTED—Continued

GRADUATE CHEMIST

Exceptional opportunity for experienced compounder with nationally known rubber company. Location eastern seaboard. Replies should give education, experience, and salary requirements.

Address Box 491-W, RUBBER AGE.

RUBBER MILL ROOM FOREMAN, with working knowledge of compounding, Banbury operation, milling and extruding, as well as stock handling. Firm located northern New England. A growing business offering challenge and opportunity. Business primarily mechanical goods, O rings, seals, etc. Address Box 495-W, RUBBER AGE.

TECHNICAL SALES REPRESENTATIVE

Technical sales position open for man experienced in rubber cements and adhesives field. Should be free to travel eastern part of country. Salary commensurate with ability and experience. Write full details. Replies kept confidential. Address Box 497-W, RUBBER AGE.

CHEMIST (Rubber) Industrial Rubber "O" Ring and Packing Manufacturer desires chemist between 25 and 35 with at least three years experience in rubber chemistry for research and development work assisting chief chemist. Location—Mid West. Please give education, experience, background, salary, etc. Address Box 498-W, RUBBER AGE.

CHEMIST—Experience in pressure sensitive adhesives and release papers. Well established Chicago firm looking for continued expansion needs technical director. Complete authority reporting directly to President. Salary open commensurate with experience and ability. Write fully. Replies will be kept confidential. Address Box 499-W, RUBBER AGE.

RUBBER CHEMISTS

A fast growing and progressive organization in the Midwest has opportunities for experienced graduate chemists and chemical engineers in resin and rubber adhesive coatings. Assignments include product development of pressure-sensitive tapes in a modern and well equipped laboratory and follow-through in pilot and production plants. Excellent working conditions, salary commensurate with experience. Send complete resumé with first letter. All replies held in strict confidence. Address Box 500-W, RUBBER AGE.

WANTED: Engineer, thoroughly experienced in all phases regarding the manufacture of vinyl wire inserted flexible hose. This is an excellent opportunity to work with a progressive company on either a consultant or permanent position basis. Submit full details. Address Box 501-W, RUBBER AGE.

PLANT MANAGER FOR PRECISION MOLDED GOODS

New and modern Northeastern Ohio manufacturer requires man with technical, production and general administrative ability. All replies confidential. Address Box 503-W, RUBBER AGE.

EXECUTIVE TECHNICAL SALES OFFICE
Nelson EMPLOYMENT SERVICE
specialist for the "Rubber Industry"
HAROLD NELSON — **653 FIRST NATIONAL TOWER**
PHONE: PORTAGE 2-8801 — **AKRON 8, OHIO**

"Help Wanted" continued on next page

FLEXO JOINTS

THE STANDARD FOR SAFETY

- Proved in years of efficient service, FLEXO JOINTS offer the flexibility of hose — the strength of pipe — the ideal steam connection for presses, tire molds, etc.
- Four styles, for standard pipe sizes ¼" to 3".
- Write for information and prices.

FLEXO SUPPLY CO., INC., 4662 Page Blvd., St. Louis 13, Mo. S. A. ARMSTRONG, LTD. *In Canada:* 1400 O'Connor Dr., Toronto 13, Ont.

HELP WANTED—Continued

DEVELOPMENT ENGINEER for product design on hose and belting wanted by major mechanical rubber goods company in Great Lakes area. Excellent opportunity for man interested in pursuing all phases of development design and free from routine factory problems. Replies confidential. Our employees know of this ad. Address Box 504-W, RUBBER AGE.

ASSISTANT ELECTRICAL ENGINEER
With electronic or communication training or experience. In reply give full resumé of education, experience and salary requirements to
WHITNEY BLAKE COMPANY
1565 Dixwell Avenue
Hamden, Connecticut

MOLDED GOODS PRODUCTION SUPERVISOR
Northern New Jersey
Our company anticipates further expansion of rubber molded goods department. We desire man with broad molded goods background including the actual know-how. Salary commensurate with ability and background, minimum; $6,000.00 yearly.
Please forward resumé to Box 510-W, RUBBER AGE.

MECHANICAL ENGINEER

3-5 years experience in research and development. A "gadgeteer" to assist in developing applications for rubber and plastics.

THE M. W. KELLOGG CO.
FOOT OF DANFORTH AVE.
JERSEY CITY, N. J.

RUBBER CHEMISTS TECHNOLOGISTS

Minimum 5 years experience compounding synthetic rubbers for specialty applications. Should know molding extrusion, and fabricating practice. Background interest in research and development rather than production.

THE M. W. KELLOGG CO.
FOOT OF DANFORTH AVE.
JERSEY CITY, N. J.

RUBBER CHEMIST

AAA-1 CENTRAL WEST MANUFACTURER has position for man with experience in developing and producing sponge from natural and synthetic rubber. Must have proven ability. Send resumé and salary desired with first letter. Our technical staff knows of this advertisement.
Address Box 507-W, RUBBER AGE

RUBBER & PLASTIC TECHNOLOGIST

Young man, chemist or chemical engineer

Should have five years experience coating or impregnating textiles with rubber latices, adhesives, resins and other elastomers. Knowledge of compounding for specific end use properties essential.

Excellent opportunity for man with proved experience and ability in product development and production.

National organization with plants in northeast.

Our employees know of this advertisement.

All replies will be held in strict confidence.

Address Box 509-W, RUBBER AGE

Mold Lubricants

Silicones • Non-Silicones

We blend the mold lubricant to the job. Tell us your molding problems. We have a wide variety of standard lubricants from which to choose the one for your job.

Write today for technical data and price lists.

Stoner's Ink Company
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Oxides and Carbonates Light and Heavy—Tech. and U. S. P. Quality

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THE PHILIP CAREY MFG. COMPANY
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Offices and Distributors in all Principal Cities

softeners and plasticizers for rubber from the pine tree

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BURGUNDY PITCH
GALEX a non-oxidizing RESIN
Send for "Pine Tree Products" Booklet

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Are you looking for an excellent reinforcing ingredient at a lower cost? Try Hakuenka (Activated Calcium Carbonate).

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Special attention to Export Trade
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R. R. OLIN LABORATORIES, INC.
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Corrosion, weathering and sunlight tests. Four locations in Southern Florida for inland, salt atmospheric, tidewater and total immersion exposure tests.
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HALE AND KULLGREN, INC.
Specialists in Process and Plants for Rubber and Plastics
A Complete Engineering Service: Including: Economic Surveys; Process Design; Installation; Contracting and Operation.
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MARYLAND CORK COMPANY, INC.
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Baltimore 1, Maryland

STATEMENT REQUIRED BY THE ACT OF AUGUST 24, 1912, AS AMENDED BY THE ACTS OF MARCH 3, 1933, AND JULY 2, 1946 (Title 39, United States Code, Section 233) SHOWING THE OWNERSHIP, MANAGEMENT, AND CIRCULATION of RUBBER AGE, published Monthly at East Stroudsburg, Penna., for October 1, 1955.

1. The names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher, Palmerton Publishing Company, Inc., 101 West 31st St., New York 1, N. Y.; Editor, M. E. Lerner, 101 West 31st St., New York 1, N. Y.; Managing Editor, None; Business Manager, Peter P. Pinto, 101 West 31st St., New York 1, N. Y.

2. The owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 percent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a partnership or other unincorporated firm, its name and address as well as that of each individual member, must be given.)

Palmerton Publishing Company, Inc., 101 West 31st St., New York 1, N. Y.; P. L. Palmerton, 101 West 31st St., New York 1, N. Y.; Peter P. Pinto, 101 West 31st St., New York 1, N. Y.; M. E. Lerner, 101 West 31st St., New York 1, N. Y.; C. T. Jansen, 101 West 31st St., New York 1, N. Y.; E. D. Osborn, 149 East 73rd St., New York 21, N. Y.; Hildegard E. Palmerton, 56 Vassar Place, Rockville Center, N. Y.

3. The known bondholders, mortgagees, and other security holders owning or holding 1 percent or more of total amount of bonds, mortgages, or other securities are:

None.

4. Paragraphs 2 and 3 include, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting; also the statements in the two paragraphs show the affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner.

PETER P. PINTO, Business Manager.

Sworn to and subscribed before me this 23rd day of September, 1955.
(SEAL) JACOB B. SCHNEITZER, Notary Public.
(My commission expires March 30, 1956)

BUSINESS OPPORTUNITIES

CUSTOM MIXING, GRINDING and DISPERSION. Production time available on Rotary Cutters, Colloid Mills and explosion-proof Churns with attached filtering mediums. At your service—the technical know-how and completely equipped control laboratory. ADHESIVES & COATING SPECIALTIES, INC., Bldg. #22, 410 Frelinghuysen Ave., Newark 5, N. J.

WANTED

MANUFACTURER'S AGENT for line of neoprene and Hypalon protective coatings. Eastern seaboard and midwestern states. Address Box 465-B, RUBBER AGE.

REPRESENTATIVES now handling rubber processing machinery to sell new improved 20-ton hydraulic press manufactured by former distributors of Preco press. Protected territories. Write stating background and commission terms. Address Box 505-B, RUBBER AGE.

TOP MANAGEMENT EXECUTIVE, sales experience, Chemical Engineering degree, wants to be contacted by first class manufacturers wanting New England sales representation. Products to be sold to rubber and plastic manufacturers. All replies confidential. Address Box 511-B, RUBBER AGE.

RUBBER TECHNOLOGIST, Chemical Engineering graduate with many years of successful management, production, development and sales experience wants to work on a consulting basis with manufacturers having problems that fall in the area of my qualifications. Address Box 512-B, RUBBER AGE.

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Master Batching
Mixing of all kinds

BESTREAD PRODUCTS CO. **STOUGHTON, MASS.**

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Cord Latexing, expanding mandrels, automatic cutting skiving, flipping and roll drive wrapping machines.

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All kinds of *used* machinery for the Rubber and Allied Industries.

Hydraulic Presses, Laboratory Mills and Presses, Sponge Rubber Vulcanizing Presses, Drilled Steel Steam Platens, Rubber Bale Cutters guillotine type, Vulcanizers with quick opening doors, etc.

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LAWRENCE N. BARRY

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INDUSTRIAL SUBURBAN REAL ESTATE:—Approximately 100,000 sq. ft. of land and concrete block building with 9900 sq. ft. manufacturing or industrial floor area—with office and boiler room extensions—Middle section main building has height of 21 ft. with monitor roof, travelling crane, 14 ft. high doors at each end. Concrete floors, steel sash, etc. Ample land with frontage on Locust St. Ideally located, only 15 minutes from Boston, next to Mystic Valley Parkway.

NAME AND GOODWILL:—The name and goodwill, right to manufacture the complete Barry line of machinery, list of customers. A valuable business or an adjunct to another line.

MACHINERY & EQUIPMENT:—BIRMINGHAM 64 IN. 3 ROLL RUBBER CALENDER—BIRMINGHAM 54 IN. MIXING MILL—8 Embossing Calenders 23 in. to 73 in. wide, Hot Facing Calender, 6 Mixing Mills 24 in. to 40 in. wide, Barry Spreader, DAY and MORRILL PAINT MILLS, Hyd. Press, Ribbon Blender, Ball Mills, Guillotine Cutters, Churns, Sheeter, Saturation Oven, Dinkers, Heel Trimmers, rolls, gears, parts, etc., etc. LEHMANN "HYDRATOL" LATHE, 36 IN. SWING, 180 IN. BETWEEN CENTERS — PITTSBURGH LATHE, 50 IN. SWING, 192 IN. BETWEEN CENTERS—Hendey, Flather, So. Bend, Niles and other lathes, Putnam Gap Lathe, NILES and NEWTON VERTICAL SLOTTERS, CINCINNATI BICKFORD RADIAL DRILL, Smith & Mills Crank Shaper, Walker-Turner and other drill presses, Flather and Wheeler Iron Planers, Bullard Boring Mill, Hendey-Norton Miller, Wilson Hyd. Forcing Press, Lincoln "Fleetwelder", Skilsaw, Grinders, Hack Saws, Pipe Threader, Chuchs, Vises, Micrometers, Small Tools and Supplies, Motors, Chain Hoists, speed reducers, etc., etc. Adding machine, desks, files, etc.

Per Order Executrix of Estate of Lawrence N. Barry. Sale to take place upon the premises commencing with the real estate, then the name and goodwill, and immediately following the machinery and equipment piece by piece. A deposit of 10% will be required on the real estate, 25% on personal property. Inspection the 7 business days preceding the sale. Illustrated and descriptive catalog upon application.

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PHONE: GLENVIEW 2-4991

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WANTED: Foam rubber of any kind, any quantity.

NUPRO CORPORATION

845 Meeker Avenue, Brooklyn 22, New York

Phone: STagg 2-8651

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WANTED: Mixers: Sigma Blade or Banbury; Extruders; 2-Roll Mills; Cutters; Presses, etc. PERRY EQUIPMENT CORP., 1409 North 6th St., Philadelphia 22, Penna.

2-ROLL LABORATORY MILL
6 x 12, for plastics, flood lubrication. Must be topnotch condition.
Address Box 490-E, RUBBER AGE.

PLANTS FOR SALE

SACRIFICE! New Latex Foam Products Plant. See it in action, the latest in molds, conveyors, etc. You'll save thousands, so get in on this deal before your year ends. They are using 6 lbs. foam in '56 cars while in '57 they will be using 23 lbs. foam. Here's your chance to be in the latex foam business. Your inspection is welcomed. Contact Jim Brown, BREWSTER MACHINE CO., 349 E. Exchange St., Akron 4, Ohio. Phone: Franklin 6-2911.

FOR SALE: Small, centrally located, molded rubber plant. Highly profitable and successful. Reason for selling, poor health. Address Box 513-F, RUBBER AGE.

EQUIPMENT FOR SALE

FOR SALE: Automotive Bushing molds for clam press operation per following part numbers: #7240—230 cavities; #760—289 civities; #761—64 cavities; #779—225 cavities. MADISON RUBBER CORP., 490 Madison St., Conneaut, Ohio.

1—Farrel 6" extruder, 40 h.p. motor, camelback head, like new; 1—2-roll 10" x 30" calender; 1—clicking machine, 24" x 6'; 1—30" x 30" x 16" ram press; 1—500 h.p. motor, 3 speed with controls for #11 Banbury. BREWSTER MACHINE CO., 349 East Exchange St., Akron 4, Ohio. Call Jim Brown, Akron, Franklin 6-2911.

HYDRAULIC PRESSES

ELMES 1000 ton hobbing press, MD pump.
BALDWIN-SOUTHWARK 3600 ton belt press.
HPM 750 ton, self-contained.
WATSON-STILLMAN 600 ton hobbing press, MD pump.
LAKE ERIE 215 ton self-contained, semi-automatic.
WATSON-STILLMAN and HPM 100 ton, BURROUGHS 75 ton electrically heated, HPM 35 ton molding presses. WATSON-STILLMAN and ELMES 30 and 20 ton lab presses. STOKES Model 200D-3 automatic and 200 ton, 150 ton and 100 ton semi-automatic presses.

INJECTION MACHINES

IMPCO VF-822 and VF-822A, 350 tons clamp.
HPM Model 200-H-9, 9 oz., 200 tons clamp.
HPM Model 350-H-16, 16 oz., 350 tons clamp.
REED-PRENTICE 12 oz., 1952 machine.
REED-PRENTICE and WATSON-STILLMAN 2 oz.
VAN DORN Model H-200, 1 oz. (2).

TABLET MACHINES

STOKES S-5, R, T and RDS-3 and COLTON #5, #5½, and 2RP.

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4—FARREL 18" x 50", 250 HP speed reducer. Available as a mill line or individual units.
4—FARREL 16" x 40", 150 HP motor and speed reducer.

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6" ROYLE #4, 6" ALLEN-WILLIAMS "RAPIDO," 4½" HARTIG, 3½" HARTIG, 2" ROYLE #1, All Individual Motor Drive.

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BANBURY #1, completely chrome plated interior for plastics, 50 HP motor drive, oil heating system, all controls.
BAKER-PERKINS, jacketed, 2¼ gallons, gear-motor drive.
MISCELLANEOUS: Vulcanizers, Calenders, Grinders, Pumps, Valves, Platens, Etc.

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BIgelow 8-2500

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"Equipment for Sale" continued on next page

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REBUILT MACHINERY

MILLS, CALENDERS, TUBERS, VULCANIZERS, PUMPS, ACCUMULATORS, MIXERS, PULVERIZERS, HYDRAULIC PRESSES, CUTTING MACHINES

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like one hammer

for a crew of carpenters,

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We are one of the foremost specialists in supplying used, reconditioned, and new machinery for the Rubber and Plastic industries only. NEW—Laboratory mills, hydraulic presses, extruders, bale cutters, and vulcanizers. We are interested in purchasing your surplus machinery or complete plant.

"ARMACO"

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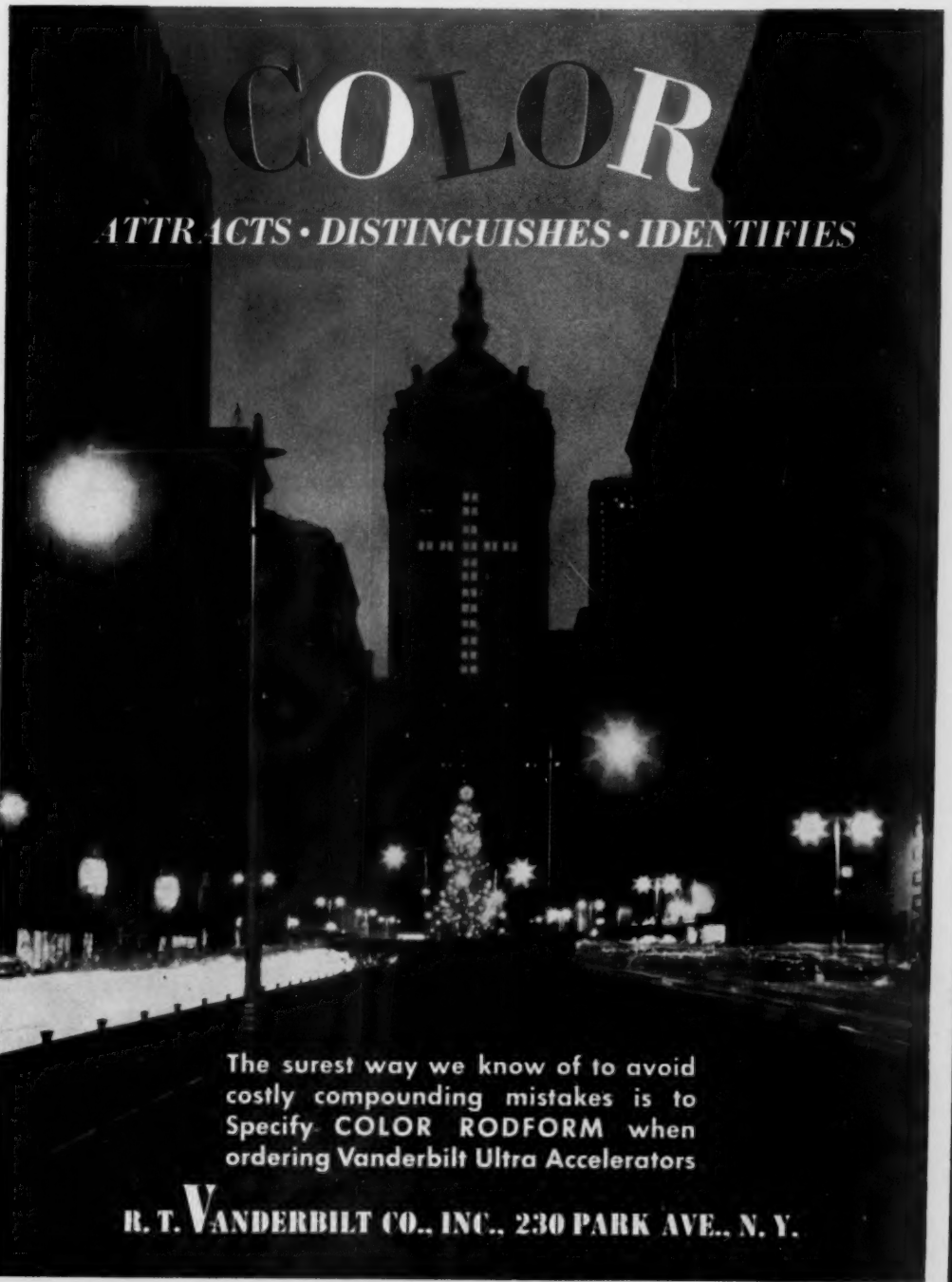
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